

# **Adoption of Internet Services in the Enlarged European Union**

## **Lessons from the Internet banking case**

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## Executive Summary

For the development of the Information Society, both the supply and adoption of Internet services are key building blocks. Adoption of Internet services in Candidate Countries (CCs)<sup>1</sup> is reported to be low, with some exceptions such as Estonia, and the lack of publicly available official statistics accentuates the problem of understanding the supply-demand dynamics, drivers and barriers and potential policy options.

Retail Internet banking is one of the most developed Internet services in Candidate Countries (CCs) and the analysis of the supply and demand dynamics may reveal drivers and barriers for adoption that could apply to other sectors (e-government, e-administration, e-health), as well as suggesting potential policy options for the development of the Information Society. In line with eEurope 2005 objectives, retail Internet banking is an example of a content based secure application, based on an open information infrastructure, creating new markets and contributing to cost reduction.

However, the provision as such of Internet services by the banks does not ensure adoption by users and consequently is not sufficient to achieve the full potential of the IS. Understanding the supply/demand relationship is key to achieving the Lisbon targets. In this report we analyze the dynamics of supply and adoption of Internet banking services, both in the EU15 and in CCs.

The analysis of supply shows that most major banks in the EU15 and in the CCs have invested, and are still investing, in providing Internet banking services as a new cost-effective delivery channel, driven by cost reduction, market share increase and customer retention targets. Profitability remains, however, a challenge. *In the CCs particularly*, despite weaker financial stability, less developed financial services and lower demand, the vast majority of banks have invested and continue to invest in Internet banking technology, mostly driven by western private owners' cost-effectiveness targets and by competitive reasons. Finally, experience shows that Internet banking brings increased cost-efficiency and customer profitability leading to increased competition among banks and new products and services for consumers. In the context of a bank sector that will expand (in CCs) with expected increased competition, Internet banking could become instrumental in increasing both cost-effectiveness and value to consumers.

The analysis of demand shows a lack of available public and official data and this presents significant methodological limitations. European<sup>2</sup> average adoption of Internet banking is estimated to be 13% of the total population (Datamonitor, 2002) with important northern – southern country variances. The CCs adoption average is very low and far behind EU15, in spite of all the major banks offering the services. There are also huge country variances.

Factors influencing adoption are a complex set of different aspects including access technology and infrastructure related factors, sector-specific Internet banking factors and other socio-economic factors. Indeed, the analysis shows that development of a service by the banks is not

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<sup>1</sup> The thirteen "Candidate countries" are: The Baltic republics of Estonia, Lithuania and Latvia; The Mediterranean countries Turkey, Malta and Cyprus; The Central European ones Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia. At the date of this report (June 2003) the negotiations have been concluded with Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovak Republic and Slovenia. Those ten countries are used to be called "Acceding countries" during the intermediary period between the end of negotiations and effective membership. After ratification these countries will join the EU (on 1<sup>st</sup> May 2004). Detailed roadmaps have been agreed for Bulgaria and Romania, which offer them the perspective of membership from 2007. The prospect established of starting Turkey's accession negotiations without delay after December 2004 if it fulfils the Copenhagen political criteria (European Commission, 2003. Choosing to grow: Knowledge, innovation and jobs in a cohesive society. Report to the Spring European Council, 21 March 2003 on the Lisbon strategy of economic, social and environmental renewal. COM(2003) 5 final, p.21. EC, Brussels.).

<sup>2</sup> EU countries excluding Austria, Greece, Ireland and Portugal

sufficient, on its own, to ensure adoption. Access infrastructure to the service is a pre-requisite and access at home may be a relevant factor. Time and trust are needed to convert consumers to the use of banks e-delivery channels, including the Internet. In fact, Internet penetration is regarded as having a strong influence, and a threshold of 30% has been identified as a take-off factor.

Low PC and Internet penetration in general, and particularly at home, has been identified as one of the most important potential barriers for development of Internet banking in CCs. The technical limitations of fixed lines and their limited and stagnating penetration, potentially further hindered by the fast and widespread take up of mobile subscriptions, together with the very low penetration of alternative Internet access technologies, networks and devices (broadband DSL, CATV, FWA) may represent a potential bottleneck for short to medium term Internet penetration development in CCs.

Additionally, consumer security and privacy concerns are reported as an important potential barrier, potentially aggravated by a post-Sep11 scenario where the authorities have increasing power to control.

Other sector-specific barriers that are expected to limit in the short to medium term the potential and the pace of development growth of Internet banking are the lower levels of trust in banking institutions, the fact that financial services are less developed and used, and a less developed e-banking culture (except for Estonia, Slovenia and Malta for the latter). Therefore, though growth potential is predicted in CCs, the speed of development is uncertain given the barriers identified.

Take-up of mobile and iDTV banking is low, due to access technology barriers, limitation of the devices and the quality of service. These barriers limit in the short to medium term the use of these channels to complementary niche applications addressing the needs of limited customer segments. The PC remains, so far, the most user-friendly interface for this type of application.

Lessons learned for the development and adoption of other sectors' Internet services are explored, for example, the impact of low PC/Internet penetration on the supply side of Internet services due to low demand. The importance of considering sector-specific characteristics and consumer-specific habits and motivation is also highlighted. The technical and usability barriers of the mobile interface identified for Internet banking may also impact on the adoption of other mobile applications, such as e-administration.

Finally, a number of potential public and private policy options that would address the set of barriers identified, in order to stimulate the use of the Internet in general, and the use of Internet-based services in particular, are suggested.

# 1. Introduction

## The policy agenda, Internet banking and questions for research

eEurope is part of the strategy set out by the Lisbon European Council (March 2000) to make the European Union the most competitive and dynamic knowledge-based economy with improved employment and social cohesion by 2010.

The Barcelona European Council (March 2002) called on the Commission to draw up an eEurope action plan focussing on “*the widespread availability and use of broadband networks throughout the Union by 2005 .... and the security of networks and information, eGovernment, eLearning, eHealth and eBusiness*”.<sup>3</sup> This action plan follows the eEurope 2002 action plan and its equivalent for the CCs, the eEurope+ initiative.

To create a knowledge economy, eEurope 2002 focused on extending Internet connectivity in Europe. In order to generate growth, connectivity needs to be translated into economic activities. This is the focus of eEurope 2005: stimulating services, applications and content, based on a widely available broad band access and a secure information infrastructure, covering both on-line public services and e-business, that create new markets and reduce costs and eventually increase productivity throughout the economy.<sup>4</sup>

For the development of the Information Society (IS), both the supply and adoption of Internet services are key building blocks. Adoption of Internet services in CCs is reported to be low (Gourova, 2002), with some exceptions such as Estonia. The lack of publicly available official statistics accentuates the problem of understanding the supply-demand dynamics, drivers and barriers and potential policy options.

Retail Internet banking is one of the most developed Internet services in CCs and the analysis of the supply and demand dynamics may reveal drivers and barriers for adoption that could apply to other sectors (e-government, e-administration, e-health) and could also suggest potential policy options for the development of the Information Society (IS). In line with eEurope 2005 objectives, retail Internet banking is an example of a content based secure application, based on an open information infrastructure, that creates new markets and contributes to cost reduction.

Internet banking operations currently represent between 5 - 10% of the total volume of retail banking transactions both in the United States and in Europe. This is less than the share of Internet securities trading, estimated at between 20 - 25% of the total, but much more than overall business-to-consumer (BC2) e-commerce, which represents less than 2% of total retail trade (UNCTAD, 2002). Furthermore, the banking sector is one of the major ‘user’ sectors of ICTs and, in Central and Eastern Europe, this sector plays a significant role in the development of ICT hardware and software infrastructure (EITO 2002). Being essentially information businesses, banks do not produce physical products and have been trading electronically for decades. For these reasons, hardly any other sector is better suited for e-business.

Furthermore, a number of experts<sup>5</sup> have indicated that the development of Internet banking in CCs is having a positive impact on other sectors besides the banking industry, i.e.:

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<sup>3</sup> Barcelona European Council, Presidency Conclusions, paragraph 40 (<http://ue.eu.int/en/Info/Eurocouncil/index.htm>)

<sup>4</sup> eEurope 2005 : An Information Society for all; An action plan to be presented in view of the Sevilla European Council, 21/22 June 2002, P.7 ([http://europa.eu.int/information\\_society/eeurope/news\\_library/documents/eeurope2005/eeurope2005\\_en.pdf](http://europa.eu.int/information_society/eeurope/news_library/documents/eeurope2005/eeurope2005_en.pdf))

<sup>5</sup> Kerem, 2003; ICT Panel experts, Workshop “IS Development Strategies in CCs”, February 2002 (See Appendix 2 for detailed list).

- on the ICT supply side, the development of Internet banking has stimulated a competence building process in the ICT industry in innovation areas such as Internet application software and Internet security solutions (cryptography, authentication), resulting in the creation of value added enterprises offering services to the banks, to other sectors and to banks in other countries;
- on the supply side of other sectors, authentication solutions deployed by the banks are used by other service providers such as public administrations to provide Internet services, so that consumers can use their Internet bank ID as an identification or signature tool for other services;
- on the demand side, Internet banking has started transforming the way people live and interact, and the PC and Internet skills developed, investments made and behaviour learnt could be transferred to other private and public Internet services (e-commerce, e-administration, e-health), stimulating their use.

However, the provision as such of Internet services by the banks does not ensure adoption by users and consequently is not sufficient on its own to achieve the full potential of the IS. Understanding the supply/demand relationship is key to achieving the Lisbon targets. In concrete terms, we address the following research questions:

- What is the current Internet banking level of supply in EU15 and in CCs? What are the drivers and barriers for development?
- What is the current level of adoption by consumers? What are the drivers and barriers for adoption?
- Are there specific supply/demand issues in CCs?
- Can lessons be learnt for other sectors' Internet services, in particular in the CCs?
- What are potential private/public policy options for dealing with these specific issues?

## Methodological note

This study has mainly been carried out through desk research.

The general lack of available public and official data on Internet banking services and their adoption by the consumer in the EU, is more acute in the CCs, where Internet banking is less developed. The author's compilation of data both for the EU15 and CCs is based on a diversity of mostly non-official 'private' sources (consulting and market research companies such as Datamonitor and Forrester, banks web sites and press releases), is incomplete and some times disconnected. Although some data on a selection of individual countries and banks has been complemented with individual questionnaires and interviews, the data provided in this report and comparisons should be read as indicative and be interpreted with reservations.

The quality assurance process of this research report has included an IPTS peer review, the review by individual Internet banking experts from industry, research and policy making sectors, and the review by an ICT expert panel from the industry, research and regulatory sectors, during a workshop organised end Feb 2003 (See Appendix 2 for a list of experts). Comments collected during the course of these reviews have been incorporated in this final version.

## 2. Internet banking services supply

In this chapter we analyse the role of Internet banking as a new service delivery channel for banks, the type of services that are provided as well as the major drivers and challenges in the supply of these services. We also explore the level of supply in EU15 and in the CCs including a more detailed analysis of the banking sector in these transition economies. This analysis will show that, in spite of the fact that profitability is expected only in the long term, most of the major banks both in EU15 and CCs do provide Internet banking services, driven by cost reduction, market share increase and customer retention targets.

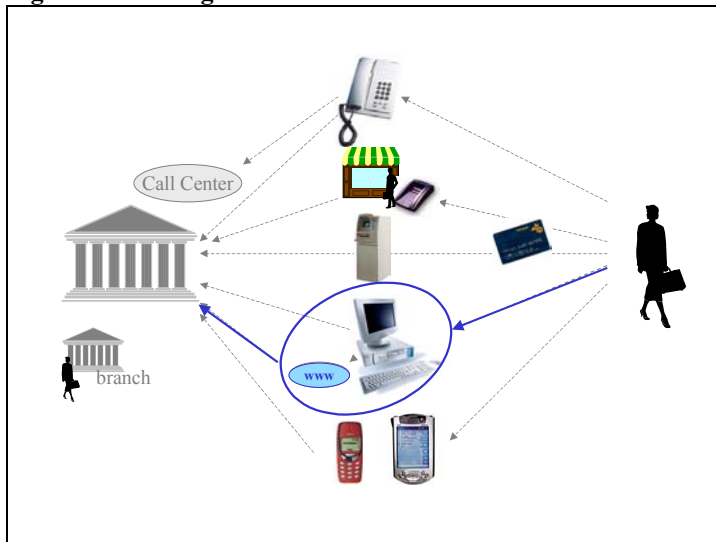
### Internet, a cost effective delivery channel

Drivers for the take up of information and communication technologies by the banks have been many: cost-reduction, mergers and acquisitions, strategic alliances, competition, globalisation, operational risks, cost reduction, time to market, surging volumes, e-commerce, enhancing flexibility, business diversification such as non-financial services and becoming “service aggregators”, etc.

The developments in information collection, storage, processing, transmission and distribution technologies have influenced for a long time, and continue to influence all aspects of banking activity, and have become an integral part of product/services offering, delivery channels and internal management.

Internet banking is among the multiple remote distribution channels banks have been deploying for more than 20 years, to complement the branch and call centers and to interact with their customers, as illustrated in Figure 1 below. Phone banking, electronic payment debit, credit and electronic purse cards to pay at retail outlets or Points of Sale (POS), cash withdrawal machines and bank kiosk machines making use of Automated Teller Machines (ATM), PC banking, Internet banking, mobile banking, Personal Digital Assistant (PDA) banking and interactive Digital TV (iDTV) banking are examples of the multitude of channels and technologies used. Of the different delivery channel applications, Internet banking, a content based secure application based on the open information Internet infrastructure, has the most similarities with other IS services’ infrastructure.

**Figure 1: Banking distribution channels**





Traditionally, the banks made use of bank-owned infrastructures (although built on top of wired public telecommunication lines) to deliver ATM, POS and phone banking services. PC banking then required customers to have a PC, PC skills and a dial-up modem to access a bank server through the phone line. Internet banking, however, now requires customers to make use of non-proprietary Internet infrastructure and access, with lower penetration levels than phone lines and lower levels of security. Internet banking also requires a minimum level of user Internet skills. This move to an open environment such as the Internet represents a qualitative step with significant implications for all the actors, including banks, industry and users, and raises new policy issues.

Banks offer Internet banking mainly to increase cost-effectiveness, increase customer reach, and retain market share. Estimates for banking transactions costs across delivery channels, e.g. physical branch, phone, ATM, PC-based dial-up, show that Internet transactions are the cheapest with a relation of 1-2:100 compared to physical branches, 1-2:30 compared to ATM's and 1:2-10 compared to PC-based dial-up Internet (BIS, 2001).

Internet banking is currently offered by most medium and major banks throughout the EU15 (e-business W@tch, 2003). The empirical evidence demonstrates that medium sized banks tend to adopt new ICT technologies in general and Internet banking in particular more quickly than large or small banks, as they have greater flexibility and a propensity to innovate. Small banks which do not have enough financial resources to invest in new technologies tend to prefer direct contact with the end users (e-business W@tch, 2003; Corrocher, 2002).

Experience shows that, if done correctly, on-line banking can increase customer satisfaction, boost retention and improve profitability through cost efficiency and increased customer profitability. Analysis of countries where Internet banking is most developed<sup>6</sup> also indicates that Internet banking brings increased competition among banks and new products and services for consumers. Finally, Internet banking could be an enabling instrument for cross-border bank expansion.<sup>7</sup> Initiatives, however, remain limited partly due to the fact that the Internet is often used as a complementary channel to the branch network, which is by definition local (ECB, 2002c).

In their analysis of the role of the Internet channel in banking operations, recent reports (Datamonitor 2001, Bank of Korea 2001, Fundación auna 2002 and Swedish Banking Association) suggest that Internet banking is becoming a complementary channel to branch and call centres, and is mostly used for simple transactions. Consequently the Internet is changing the role, organisation and, in some cases, the number of branches, as these will tend to concentrate on advisory and selling functions (ECB, 2002c).<sup>8</sup>

## Internet banking services

The functions provided by banks on the Internet have evolved from simple consultation of account to a full range of banking services. In the most developed applications, one can access nearly all services accessible at the branch or by phone on the Internet. In addition to offering all "branch-based" services, technology allows banks to offer new added value services only available on-line such as personalised financial information menus, e-mail alerts, electronic commerce, real-time brokerage and third party services (management of electricity bills, tax

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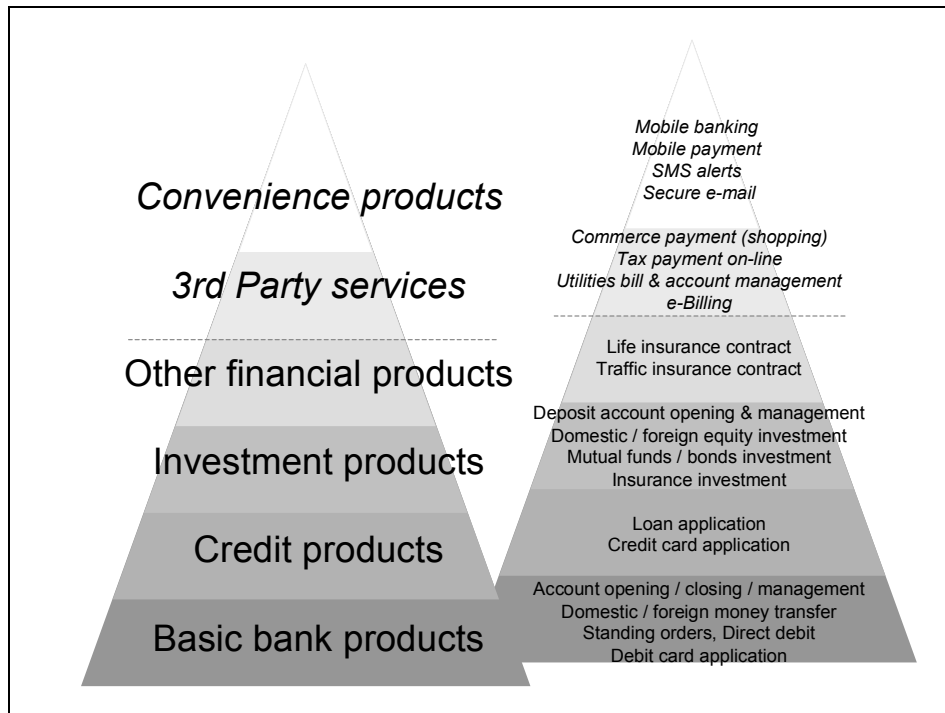
<sup>6</sup> Sweden, UK

<sup>7</sup> Swedish Banking Association and Bank of Valletta, Malta

<sup>8</sup> Also reported in Sweden (Swedish Banking Association), in Finland (ECB, 1999), in Estonia (Hansabank), Erste Bank.

payment or portals) which increase the benefits and interest of the service. Figure 2 below shows a possible classification of Internet banking services:

**Figure 2: Classification of Internet banking services**



## Internet banking supply challenges

Banks have adopted different strategies when incorporating Internet technologies into their services:

- creation of an Internet only bank;
- addition of Internet as a complementary distribution channel;
- a thorough restructuring of bank services production processes making use of new information and telecommunication technologies (including, but not limited to, Internet technology);
- creation of an Internet bank as a subsidiary of the bricks and mortar bank, with a new brand, targeting complementary consumer segments;
- or, creating an Internet bank as a financial supermarket or aggregator, moving away from the traditional vertically integrated model of financial product creation and distribution (ePSO, 2002).

Although the Internet has succeeded in lowering the entry barriers, thus providing space for more competition, the issue of the prevailing business model is still under discussion (ePSO, 2002; ECB, 2002c).

In spite of the fact that online-only banking (banks selling services only through electronic channels, mainly the Internet, without physical branches) has been less successful than was originally anticipated, with several online-only banks running into difficulties, incumbent banks also started offering financial services electronically. The threat of new entrants has led many banks to offer e-finance ranging from basic to fully integrated Internet services.

Customers preference seems to be for the “bricks and clicks” model, that is, conventional banks, with an established brand identity, that offer both online services and conventional multi-channel delivery, providing customers with a higher degree of comfort, convenience and security as compared with online-only banks. Physical branches are still the channel most used for purchasing banking products (Christiansen, OCDE, 2001; e-business W@tch, 2002). This is no surprise if we look at the types of Internet banking services offered: recent statistics show that only 11.6% of banks in EU15 sold products on-line in 2002. However, it is important to underline that most banks have been selling online for more than a year and half the banks have been selling online for more than two years. This limited percentage of banks selling online may be a response to limited consumer demand due to security concerns and therefore banks prefer to sell products through other delivery channels (e-business W@tch, 2003).

In spite of the initial high expectations for Internet banking, experience shows that the cost of introducing the new technologies, risk management, fraud, security measures and acquiring new customers are the main obstacles to achieving profitability in the short and even medium term. Furthermore, Internet banking adds new costs to the multi-channel strategy, as while critical mass is not achieved, the bank needs to maintain a multitude of increasingly complex distribution channels (ePSO, 2002; e-business W@tch, 2002). Nevertheless, Datamonitor estimates that, in Europe, eBanking technology spending on Internet banking was more than \$2.1bn in 2001, and projects increasing spending reaching more than \$2.3bn in 2005.

## Internet banking trends

The following are common Internet banking trends identified (Goldfinger, 2002a; ePSO 2002; Datamonitor, 2002; Celent 2002; Financial Internet Working Group, 2002; e-business W@tch, 2002; eMarketer, 2002):

- Closer integration with traditional banking strategies: the Internet is in the process of becoming the architectural platform of financial services and financial markets. In a few years, there will be no distinction between finance and e-finance, all financial technology from user interface, through middleware, to the core applications and networks will be Internet enabled and Internet based.
- Stronger focus on profitability: ROI, client acquisition, cross-selling and cost cutting. The global economic downturn has caused banks to cut their investments in eBanking technology significantly, focusing on integrating the different delivery channels (to achieve channel, service and brand consistency), and the front and back-office processing systems.
- Consequently, a slow down on investment in next generation technologies such as account aggregation, mobile and iTV banking is expected, as these lack in the short term a strong return on investment (ROI) case.
- Greater outsourcing of software development and operational services.

The following technologies are expected to be implemented in the short to medium term:

- Customer Relationship Management (CRM);
- Straight Through Processing (STP), which, linked to the demand for channel integration, allows once-only data capture, cuts processing times for online applications and reduces banks' costs by reducing the number of manual processes;
- Mobile banking technologies;
- Account aggregation, which allows customers to view and manage all their accounts from one single web site;

- Interactive Digital TV (iDTV) banking through different infrastructure types: satellite broadcasting with consumer antenna, Set Top Box and a phone connection as return path; cable TV; and terrestrial broadcasting;
- There are contradictory opinions regarding the need for digital signatures and public key infrastructures to provide the necessary security for the further development of Internet banking services. Although these would provide increased security, their cost and complexity are expected to limit their use for securing on-line retail banking in the foreseeable future (ePSO, 2002; Nordea, Nov 2002). However, the mobile phone could act as a catalyst in the adoption of digital signatures due to its strong penetration, the storage and cryptographic capabilities of its WIM/SIM card and its user friendliness (Centeno, 2002a).

## Internet banking supply in CCs

Banking sectors in the transition economies of Eastern Europe and Former Soviet Union have experienced major transformations throughout the 1990s. In the pre- and early-transition periods, state policies generally distorted resource allocation, as credit (subject to a variety of controls) was directed toward sustaining existing industries and maintaining living standards through explicit and implicit subsidies to enterprises and households. Since the primary role of the banking system was to channel funds to the real sector, efficiency and profitability were not among the top priorities. The banks were not engaged in evaluating the credit conditions of their borrowers, and therefore no risk management techniques were in use. Old statistical standards were designed to serve the objective of easy planning as opposed to disclosure of the true financial state of banks (Grigorian et al., 2002).

*The following text is an extract from the “Financial sector stability”, European Commission, DG for Economic & Financial Affairs, Nov 2002:*

“Most CCs have completed, or advanced to a substantial degree, the restructuring and privatization of their banking sectors. In most countries, the opening-up to foreign investors has been a salient feature in the privatization process. The share of majority foreign-owned banks in total bank assets reaches almost 100% in some countries. Although the bulk of assets is often already concentrated in a few large banks, further consolidation among fringe competitors, in particular in the mostly very small non-commercial bank sector, is to be expected in some cases.

The banking sectors do not yet properly fulfil their financial intermediation role and, thus, do not yet fully realise their potential for supporting economic growth and macroeconomic stability. The degree and efficiency of financial intermediation by transition CCs’ banking systems is still relatively low. Bank assets as a percentage of GDP in 2001, for example, ranged from 32% in Lithuania to 129% in the Czech Republic. In most transition CCs the ratio hovers around only one fourth of the Euro-area level of 267% (end 2001) of GDP. Interest rate spreads between lending and deposit rates suggests inefficiencies and lack of competition in the banking systems of some countries, in particular as regards the retail sector.

Post-restructuring and post-privatisation financial sector development may lead to new stability challenges. The relatively low degree of financial intermediation as well as GDP growth prospects suggests that the financial sector will still expand substantially. Expansion will also take place into new customer and product areas e.g. bank loans to households and small- and medium-sized enterprises. The sector expansion may, at least in some cases, also be connected with increased bank-specific risk-taking and potentially higher systemic risk if appropriate stability safeguards are not reinforced in parallel. Banks could be induced to take

on undue risks if competitive pressure increases within the banking sector, from the non-bank financial sector, and through the provision of financial services from abroad.”

The European Central Bank (ECB, 2002b) report on level to which Internet banking services are offered (see Table 1 for an extract) shows that the vast majority of banks see electronic delivery channels as a must for their industry. Banks fighting for an important part of the retail market believe they have to offer such services as an essential marketing tool.

**Table 1: Status of e-banking development in CCs, ECB Blue Book 1999 and 2002**

*Note: No information has been found for Poland and Turkey*

*Note: Except when otherwise specified, information is extracted from the Blue Book 2002*

Bulgaria	(Blue Book 1999) Some banks offer home banking (or telebanking)
Cyprus	Banking services are available through Internet and mobile phones
Czech Republic	Some banks have turned to remote banking for customer payment orders (fixed phone, mobile phone, Internet); one Internet only bank.
Estonia	In 2001, 66 % of credit transfer orders made by individuals were through Internet; In 2000 the major banks developed the Internet-based WAP banking, however, not yet widely used.
Hungary	Many banks provide services through the Internet, with different levels of quality and content of the services; There are already different mobile banking services in operation.
Latvia	Over the past few years, most banks have started to offer online services. Banks are increasingly offering home banking, Internet-based and phone-based banking to customers. In 2000 WAP banking applications were launched, and are currently offered by some banks.
Lithuania	Currently the majority of banks enable customers to manage their accounts and send payment instructions for domestic and cross-border fund transfers using Internet and online PC banking applications. Telephone banking and mobile banking is starting to make inroads on the payment services market. To date, mobile telephones have only been used to receive balance and transaction information.
Malta	Electronic (Internet/PC) banking is gaining ground as a result of the introduction of web/remote account access by one of the credit institutions, allowing access to account related information and sending payment instructions.
Romania	In recent years, a large number of e-banking services have been developed. 17 banks currently offer e-banking services, such as PC banking, mobile banking, and Internet banking.
Slovakia	Home banking, Internet banking and mobile banking are provided by all major banks.
Slovenia	Almost every bank has introduced Internet banking

The analysis of this data indicates that Internet banking is offered by at least all the major banks in most of these CCs. However, sophistication of services is expected to differ according to country and bank. Furthermore, mobile/WAP banking applications are either already offered or in the process of development in all countries listed except for Malta and Slovenia.

## Conclusions

In spite of the long-term profitability challenges, most major banks in EU15 and in CC have invested and are still investing in providing Internet banking services as a new cost-effective delivery channel, driven by cost reduction, market share increase and customer retention targets. Datamonitor estimates that spending on Internet banking technology will increase up to 2005.

Although developments in new technologies such as mobile banking and iDTV banking are taking place, a slow down is expected on banks' investments in these new delivery channels due to lack of critical mass adoption and pressure on profitability.

*In the CCs particularly*, despite the weaker financial stability, less developed financial services and lower demand, the vast majority of major banks have invested and continue to invest in Internet banking technology, mostly driven by western private owners' cost-effectiveness targets and by competitive reasons.

Experience shows that Internet banking brings increased cost-efficiency and customer profitability leading to increased competition among banks and new products and services for consumers. In the context of a bank sector that will expand (in CCs) with expected increased competition, Internet banking could become instrumental in increasing both cost-effectiveness and value to consumers.

### 3. Consumer adoption

Having seen that Internet banking services are offered by most of the major banks both in EU15 and CCs, in this chapter we focus on the consumer's adoption of the services.

The general lack of available public and official data on Internet banking services and their adoption by the consumer in the EU15, and even more so in the CCs, presents methodological limitations. Nevertheless, the author's compilation of data, from a diversity of mostly non-official 'private' sources, although incomplete and disconnected, provides a first general view of the current situation. However, data provided and comparisons made should be read as indicative and be interpreted with reservations.

We will observe that despite the benefits of Internet banking services, the adoption of on-line banking worldwide, and in particular in Europe, is low on average, with marked differences between northern and southern, and between western and central-eastern European countries. Even within those countries that have the highest Internet penetration rates (Nordic), disparities among banks are noticeable, and usage patterns vary significantly between countries with similar Internet penetration levels.

Therefore, after presenting some estimates on market adoption of Internet, mobile and iDTV banking, an analysis of adoption factors, which include technology, sector-specific and socio-economic related aspects, is presented, with a particular focus on specific issues in CCs. Then the cases of South Korea, Nordea in Finland, and Estonia are analysed in more detail as illustrative examples of successful application adoption by the consumers.

#### Internet banking adoption, market view

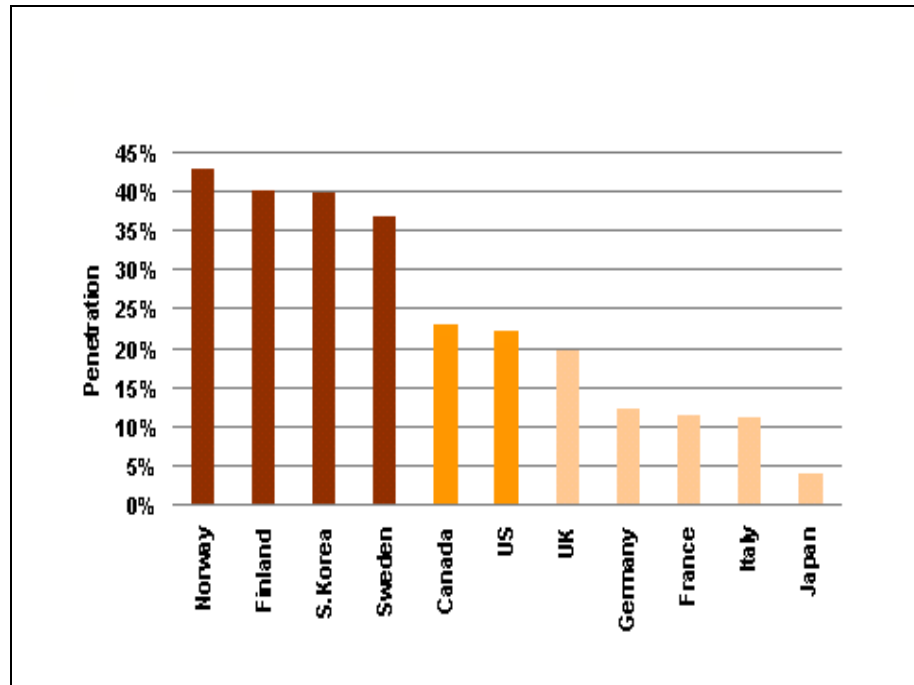
At the moment, Internet banking is moving from being an early adopter application to a digital mass-market application, and it is expected that this trend will continue, although current penetration rates are still limited. Generally speaking, statistics show that the trends of online banking contradict the prediction of fast massive diffusion of such services and the disappearance of traditional banking organisation. Consumer access and usage is making slow progress in retail banks. Consumers use the Internet as a complementary channel and continue to rely on branches and call centres, which are evolving towards providing more advisory and selling functions. For example, in the most advanced markets such as Finland and Sweden, 60% of online customers carry on making use of branches and call centres (e-business W@tch, 2003).

The consumer's motivation to use Internet banking is influenced by a combination of elements such as freedom of time and space, speed, convenience, 24 hours a day availability and price incentives (Mattila et al., 2002). The services most used are those that provide financial information: account information, loan and insurance rates, investment reports and advice. Other heavily used services are simple transactions such as bill payment and money transfer. Finally, the number of users of on-line trading functions and investment research and advice is lower and is expected to remain limited (Datamonitor, 2002; Bank of Korea, 2002; Fundación auna, 2002).

## A world-wide perspective

There is significant country variation in Internet banking penetration levels, and the differences are not clearly related to each country's level of economic development. In some countries, both industrial and developing, Internet banking is in its infancy. Meanwhile, other countries have seen rapid penetration. Celent's estimates in Figure 3 show these disparities. Figure 3 also shows that the European countries are in the lead, with Norway and Finland having the highest penetration rates among bank customers world-wide - around 40% - followed by South Korea, and far behind US and Japan. However, these statistics should be interpreted with care as numbers of "subscribed users" may not necessarily mean "active users".

**Figure 3: On-line banking penetration (% customers), Celent Nov 2002**



## Internet banking adoption in the EU15

Understanding the degree of development and the penetration level of Internet banking requires different perspectives including absolute numbers of users, penetration levels as a percentage of bank customers, of population and of Internet users:

- Significant differences exist between different sources' estimates of numbers of Internet banking users and respective growth: Forrester Research estimates 25 million users in 2002 with 16% 2002/2001 growth and Datamonitor, more optimistic, 49 million users with 36% growth. Jupiter provides the highest estimate with 54 million users in 2002.
- Nordea claims to be the e-bank with the highest number of customers (more than 3 million) and has an average customer penetration rate of 29% (Sep 2002). Other banks claiming to be leaders are Barclays and ING Direct.
- In terms of penetration as a percentage of the total population, significant northern-southern country variations are reported both by Forrester Research and Datamonitor. Figure 4 below shows that the Nordic region, Switzerland, the UK and Benelux are in the

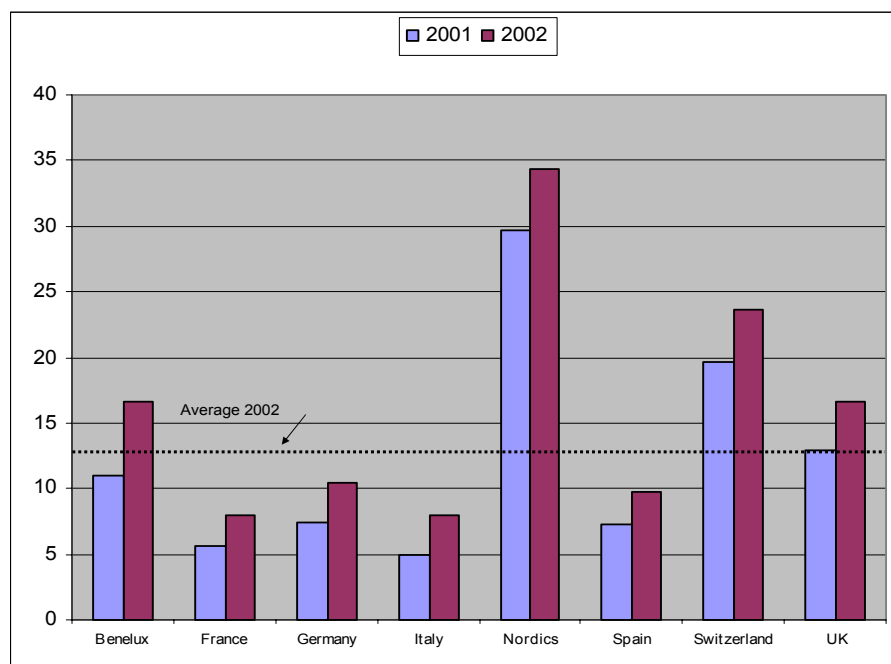


lead. Average penetration for the countries considered in Figure 4 is around 13% of total population.

**Figure 4: European Internet Banking penetration (% total pop)**

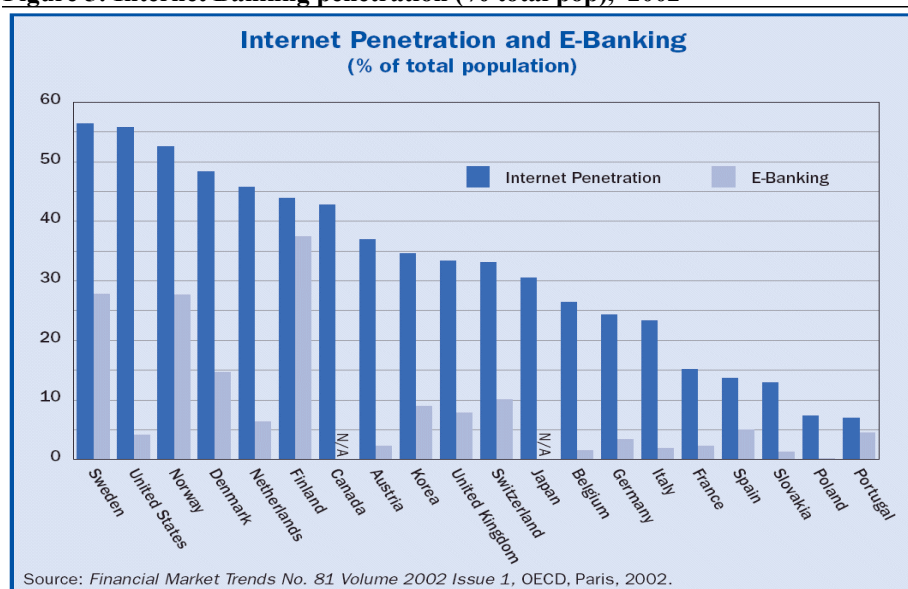
Sources: Datamonitor, Sep 2002; Population: Eurostat (1.1.2002), World Bank (2001) for non EU15 countries

Note: Missing EU15 countries: Austria, Greece, Ireland and Portugal.



One could consider the above estimations as relatively optimistic, if compared with the OECD estimates<sup>9</sup>, given in Figure 5 below:

**Figure 5: Internet Banking penetration (% total pop), 2002**

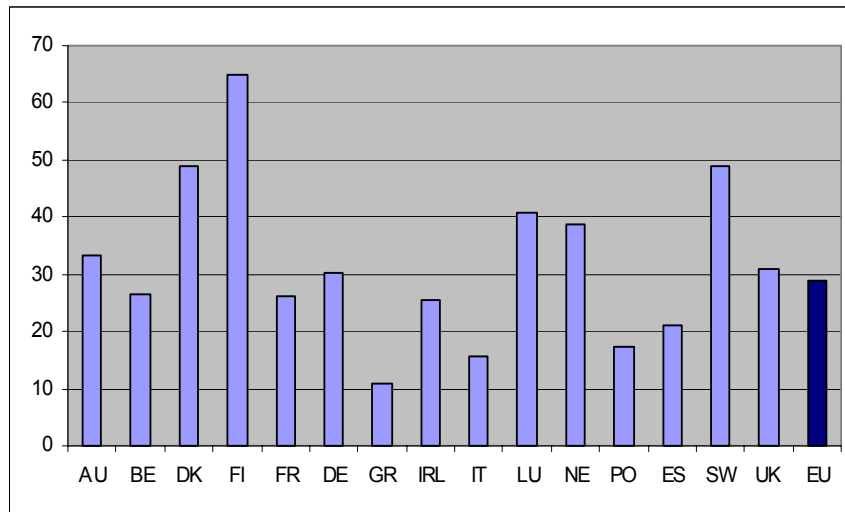


<sup>9</sup> Published in OECD in Washington newsletter May 2002 at <http://www.oecdwash.org/news/local/oecdwash-may2002.pdf>

- Finally, the Eurobarometer survey (Flash EB N° 112, June 2002) indicates that 29% of EU15 Internet users used e-banking services in Nov 2001, with significant national differences, as illustrated in Figure 6 below. Jupiter estimates for one year later, are that, by end 2002, 39% of Internet users used Internet banking.

**Figure 6: % of EU15 Internet users that bank online 11/2001**

*Source: Flash Eurobarometer N° 112, published in June 2002*



According to Datamonitor, despite investments in eBanking technologies in Europe in 2002 falling 19% to an estimated \$1.7 billion, customer growth remains very strong (2002/2001 estimated at 36%) and is predicted to reach 75 million in 2005 as customers continue to migrate to the Internet channel, particularly for transaction-based services and sales of more simple products. Datamonitor also says that banks are beginning to reap the benefits of the build-out of eBanking infrastructure.

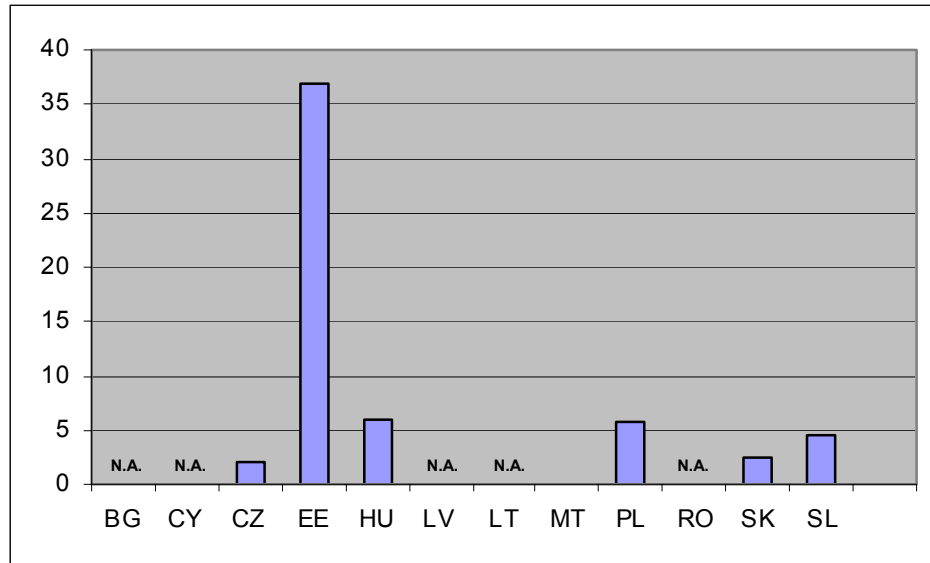
## Internet banking adoption in Candidate Countries

In spite of the data availability problems for CCs, an attempt to give estimates on penetration of Internet banking for some countries is made in Figure 7 and 8 below, as percentage of bank customers and percentage of population.

**Figure 7: Estimate of Internet banking penetration (% bank customers) (2001, 2002)**

Sources: ECB 2002b, 2001 data, for SK, SL; Hansabank, 2002, for EE; Bank Association, 2002, for PL; National Central Bank, 2001, for HU; Albassera, 2002, for CZ; Malta Council for Science and Technology, 2002, for Malta.

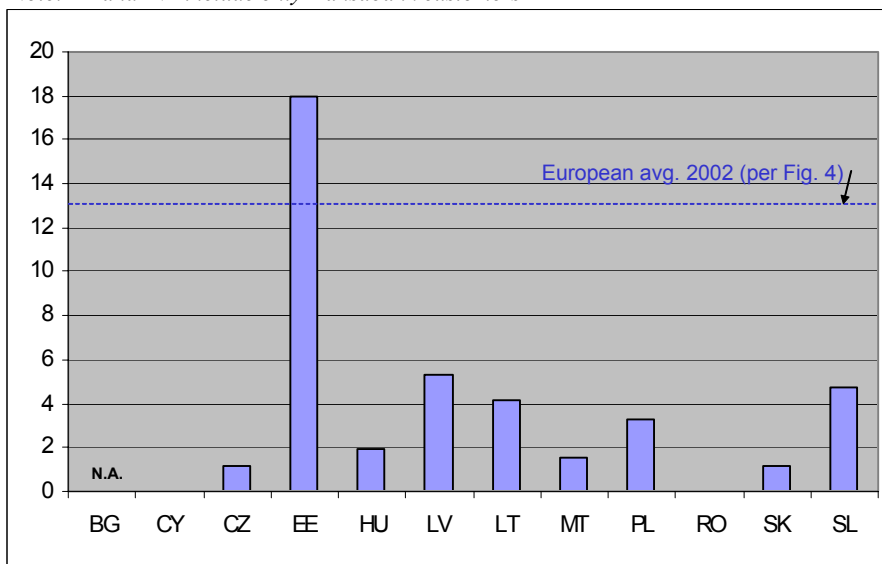
Note: Data for EE include only Hansabank.



**Figure 8: Estimate of Internet banking penetration (% total pop) (2001, 2002)**

Sources: ECB 2002b, 2001 data for CY, MT, RO, SK, SL; Albassera, Sep 2002 for CZ, HU; PL Bank Association, 2002 for PL; Hansabank, 2002 for LV, LT; UNCTAD, 2002 for EE; Population 2000: Eurostat.

Note: LT and LV include only Hansabank customers



The above Figures illustrate that, in spite of the fact that most of the major banks offer Internet banking, the average adoption level is very low and far behind EU15 average. We also observe, as in the EU15, big disparities between countries. While in Estonia, 18-25% of the population are already using I-banking (where Hansabank, with 70% of market share in 2003 reports penetration rates of 37% of bank customers), in Malta, Internet banking services were launched as recently as Dec 2002.

## Internet banking adoption factors

These big disparities in adoption levels between countries, both in EU15 and CCs, point at a complex range of factors that affect adoption of the Internet banking application. Indeed, the analysis of a number of case studies and interviews with banks<sup>10</sup> suggest a classification of adoption factors under three headings - access technology and infrastructure related factors, sector-specific Internet banking factors and other socio-economic factors - presented in Table 2 below:

**Table 2: Classification of Internet banking adoption factors**

Access technology and infrastructure related factors	Sector specific Internet banking factors	Other socio-economic factors
Penetration (PC, Internet) Skills (PC, Internet) Attitude towards technology Security and privacy concerns	Trust in banking institutions Banking culture e-banking culture Internet banking push	Institutional trust Household income level Inflation rate Level of grey economy

In the next paragraphs, the different factors are further analysed, with an emphasis on their particular importance in CCs.

### Access technology and infrastructure related factors

Internet banking is only one of many applications used by Internet users. Eurobarometer survey (FEB N° 125, June 2002) indicates that I-banking is, on average, the sixth application in order of importance of use after e-mail, search for news/topic info, search for travel information, for training/education information and for health information. This indicates that Internet banking is not a *killer application* or sufficient incentive for consumers to acquire the necessary PC and Internet infrastructure and skills to use this application. Consequently, it seems that the pre-existence of **PC and Internet access and literacy**, either at home, at work, at university or at a Public Internet Access Point (PIAP) would be a pre-requisite for Internet banking adoption.

However, over time, it may acquire considerable value for users. The survey results for Finland, which has the highest Internet banking penetration, and available data from Estonia (Kerem, 2003), shows that this application is the third most popular application in both countries, used by 65% and 57% of Internet users respectively, after e-mail and search for news/topical items.

A statistical analysis on supply-demand dynamics (Bughin, 2001)<sup>11</sup> concludes that the degree of **Internet penetration** as a measure of customer readiness to transact on-line is an important factor in explaining customer conversion to Internet banking. Indeed, it is not only positive, but also has a more than proportional effect when a country achieves a penetration of 30% of

<sup>10</sup> Nordea Bank Group in Finland, South Korea, and Hansabank in Estonia

<sup>11</sup> Based on 65 western European banks in 2000

quarterly Internet usage. This means that in countries where this threshold has already been surpassed, on-line banking usage will start to increase disproportionately. Countries like Denmark or Norway would exhibit an elasticity as high as 2.0, in contrast to Portugal, with elasticity less than 0.4, five times lower than the Scandinavian countries. Similar findings are suggested by OECD research (Christiansen, 2001), indicating a strong correlation (with logarithmic shape) between Internet penetration and I-banking, and, that countries with an Internet penetration of between 30 and 50% are likely to find themselves in the take-off phase for I-banking services.

Analysis of the Internet banking penetration success stories such as Sweden shows that during the initial stage of Internet development, an important public-private effort was made in order to strongly develop both PC and Internet penetration at home and the associated skills.<sup>12</sup> This is considered by SEB<sup>13</sup> bank in Sweden and the Swedish Banking Association to be a key success factor for Internet banking adoption.

**A positive attitude to technology** has also been reported as a factor for Internet and Internet banking adoption (Mattila et al., 2002). Her research shows that positive attitude seems to be developed through use, and that consumers who are familiar with Internet, have fewer security concerns. In line with this research, if we compare the number of payment transactions (a more risky operation) to the number of accesses (log-ons) we can observe an evolution over time towards more transactions, as services are used.<sup>14</sup> A possible trend could be that as customers acquire maturity in usage, and an increasing relevant number of services are available on-line, the patterns evolve from more consultative functions towards more transactional ones, indicating an increase in trust over time.

Similarly, favourable public opinion towards the use of technology also influences Internet adoption. In Estonia, this has been stimulated by the positive media attention created by the development of a Public Internet Access (PIAP) Network (Kerem, 2003).

### Specific issues in CCs for internet banking adoption

Analysis shows that the lack of **PC and Internet penetration** is identified by banks as a barrier for Internet banking development, both in some EU15 in countries like Spain (ePSO, 2002), and in CCs.<sup>15</sup> In the latter, this barrier has a greater impact than in the EU15 as Internet usage in Central and Eastern European countries (CEE) trails behind that of EU15 Member States. At the end of 2001, the CEE average for once-monthly Internet access was a modest 11% of the population, compared with 39% for Western Europe as a whole. At the top end, Estonia and Slovenia achieved penetration rates of 27.8% and 25.6%, respectively, in 2001. At the bottom end, Internet penetration in Bulgaria and Slovakia remained below 7% (EITO 2002, part One 1.3.8 Internet Market).

Furthermore, studies in Lithuania (Povilas, 2001), Bulgaria (ISIS, 2002) and Estonia (Kalkun et al., 2002) report low PC/Internet penetration **at home** as a major barrier for the development of the Information Society. Consequently, public-private co-operation projects have been put in place to stimulate Internet penetration in Estonia (Look@World) and in Lithuania ("Window to the Future"). Estonia, however, is an interesting case, where in spite of very low home Internet access penetration (10%), there is an Internet population penetration rate of 33% and an Internet

<sup>12</sup> Nordea, Swedish Banking Association

<sup>13</sup> SEB, Stuart Sinclair, Head of Strategy, e-banking

<sup>14</sup> For Nordea this relation is on average 1:1 (Sep 2002), for Hansabank's customers in Estonia and Latvia this relation is 2:3 and 2:5 respectively (Sep 2002), and in South Korea it is 1:5 (Sep 2001)<sup>14</sup>. These differences may depend on when the service was introduced: Nordea introduced it in 1996, Hansabank in 1996 in Estonia and in 2000 in Latvia, and South Korea in 1999.

<sup>15</sup> Erste Bank

banking penetration of 18-25% of the population (UNCTAD, 2002; Archimedes, 2002). Nevertheless, a recent study (Kalkun et al., 2002) has also identified the lack of Internet penetration at home as a barrier for further Internet and Internet banking adoption.

As there seems to be a correlation between the number of PCs in a country and the number of Internet users except in a few cases (eEurope+, 2002), CCs in general are in weak situation, with 5.6 PCs per 100 inhabitants compared to 35 in EU15 (Eurostat, 2000).

Additionally, as there seems to be a strong correlation between Internet penetration rates and cost (eEurope+, 2002), the **cost of access services and cost of PCs** inhibiting market development in the CEE region, will maintain the gap between the CEE region and Western Europe for the next few years (EITO, part One 1.3.8 Internet Market).

The concerns about security of prospective consumers are considered to be the most important factors influencing demand (Christiansen, OECD, 2001). Furthermore, the overriding factor influencing e-finance in recent years seems to have been clients' **concerns about security and safety**. This trend is reported by a number of other surveys in the EU15<sup>16</sup>, in the US (eMarketer, 2002)<sup>17</sup>, UK and Italy.<sup>18</sup> Similarly, in CCs, consumer security concerns are reported as major barriers for Internet banking adoption by several banks.<sup>19</sup>

Finally, a post-Sep11 scenario with greater power by authorities to control may worsen the situation by increasing **privacy concerns**, potentially accentuating the lack of institutional trust. Indeed, mistrust in ICT based communication/transactions, which can be seen as potential tracing or profiling tools, is reported as a serious potential obstacle to e-commerce (Gourova et al., 2002).

As PC/Internet access is a pre-requisite for Internet banking adoption, a major adoption barrier reported by different private-public actors in CCs is the low PC and Internet penetration in general, and particularly at home. Consumer security and privacy concerns are also reported as an important barrier, potentially aggravated by a post-Sep11 scenario.

### **Sector specific *Internet banking* factors**

**Trust in the banking institutions** is expected to be an underlying pre-requisite for the development of financial services. As well as trust in the institution, confidence in the security of the systems, the way private data will be used by the banks and how consumer privacy will be protected would also play an important role.

**Banking culture** factors refer to which and how banking services are used. These are influenced by the development of the service offer, the legislation and for example institutional usage of banking services. Indeed, a high usage by government institutions or enterprises of electronic payment transfers to pay salaries, benefits, pensions, etc, or even utility service providers forcing customers to pay via direct debit on current account, would strongly influence the number of people making use of bank accounts. A strong correlation between the banking culture (and

<sup>16</sup> Eurobarometer EB56, Feb 2001 consumer surveys report, after "lack of interest", "the sense of risk or danger" as the major reason for not using distance payment in EU15.

<sup>17</sup> US online adults report concerns about the security or privacy of personal information (84% of those who have not banked online) and the security of online transactions (82%) as the major barriers to online banking.

<sup>18</sup> In the UK, security/privacy concerns are reported by 78% of consumers and in Italy by 68% (American Express / International Communications Research, 2001 quoted at finfact.ie)

<sup>19</sup> Hansabank, Erste Bank, Bank of Valletta (Malta)

particularly, the percentage of people with a bank account) and the development and adoption of Internet banking services could be expected.

**e-banking culture** factors relate to the range of e-services offered and level of consumer usage of electronic channels for interfacing with the bank, or *habits*<sup>20</sup>, where time plays an important role in adoption. E-service examples are phone banking, electronic payment debit, credit and electronic purse cards to pay at retail outlets or POS, cash withdrawal machines, bank services kiosk machines, PC banking and more recently Internet, mobile and iDTV banking. Observation of countries with strong e-service penetration (Finland, Estonia, South Korea) points at a potential relation between a strong penetration of electronic delivery channels, and the faster and wider adoption of Internet banking. These findings are in line with research results on the dynamics of Internet diffusion (STAR, 2002), which show that the extent to which users will exploit the Internet's potential is likely to depend upon existing patterns of usage of traditional media and upon the existing structure of consumption. Other research (Bughin, 2001) points at bank-specific factors such as bank cost-effectiveness (characteristic of banks which have already established a large electronic channel base, measured by the private ATM density/customers) as having an important leverage effect on customer conversion to Internet banking.

e-service usage levels strongly depend on bank marketing policies to stimulate the use of electronic channels. However, cultural values, such as the importance of direct personal contact when dealing with the bank, also play a role in the definition of e-banking culture (ePSO, 2002; Kalkun et al., 2002).

**Internet banking push** factors aim at positively influencing adoption. They cover marketing and communication, service development, service quality, price incentives and the general 'push' attitude of banks towards consumers to use Internet banking, such as systematically subscribing all new customers to I-banking. Service related key success factors identified are (ePSO, 2002) service quality, reliability, availability, speed, usability<sup>21</sup>, multi-channel distribution and the seamless integration of PC-based e-finance services with all the other delivery channels (branch, phone and mobile). Nevertheless, other factors such as low quality service at the branches, insufficient number of branches or high pricing of branch services have also been proven to stimulate the adoption of Internet banking, such as in Estonia (Kerem, 2003).

### Specific issues in CCs for Internet banking adoption

The past instability of the banking sector in the CCs has created a **potential lack of confidence in the banking sector** and may hinder current and future consumer use of financial services in general (Gourova et al., 2002).

The analysis of the **degree of usage of banking services** in EU15 and CCs shows limited available data. In the EU15, according to Eurobarometer No 56 (Feb 2001), 30% of consumers have never had a bank account although strong national differences exist, i.e. 80% of Finns, but only 10% of Greeks, have current bank accounts. Similar statistics have not been identified for CCs, but generally, development of the financial services is still insufficient in most CCs and a limited use of banking products are reported (Gourova et al., 2002). Additionally, comparative indicators of degree of usage of banking services could be used, such as: number of bank

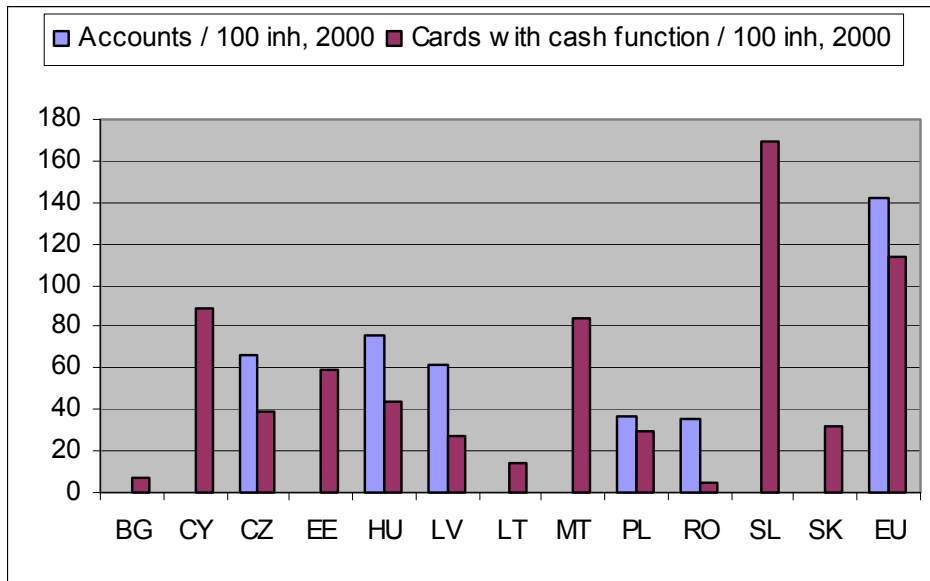
<sup>20</sup> Both Nordea and Hansabank report "habit" as an important adoption factor.

<sup>21</sup> Usability is an additional barrier for customer uptake. All top 20 European Bank sites flunk on user experience. 1 million UK users have tried online banking and then given up. Banks are loosing online customers to poor online service design (Forrester, May 2002).

accounts and bank cards with cash withdrawal function.<sup>22</sup> Figure 9 presents a comparison between some of the CCs and EU15 levels (ECB, 2002b).<sup>23</sup> Bank account penetration levels for Hungary, Czech Republic, Latvia, Poland and Romania, provide figures of 25-50% of EU15 average. Similarly, bank cash withdrawal card penetration in CCs is estimated to be half the EU15 average at most, except for Cyprus, Malta, Slovenia and Estonia, which have higher levels. These two indicators lead us to estimate that a lower percentage of the population (at least 50% less) in CCs have a bank account, which is expected to significantly limit the short-term potential for Internet banking development.

**Figure 9: Cards/accounts in CCs vs. EU15 – Bancarization indicators**

*Source ECB, 2002b; Zero values indicate no data available.*



Indicative parameters of **e-banking culture** could be the total value of cash (bank notes and coins) in circulation (as a % of GDP), the total use of cashless instruments (in number of transactions per inhabitant per year) and the degree of use of ATM's (in number of cash withdrawals per card per year). The analysis of the ECB data for 2000 in EU15 and CCs shows a lower average e-banking culture development in CCs (ECB 2002a, 2002b):

- EU15 weighted average value of cash in circulation is 4.9% of GDP, with Luxembourg and Finland having the lowest rates with 1.9 and 2.2%, and Spain has highest with 8.9%. Most of CCs cash levels are between 4.9 and 10% of GDP, except for Malta with 24.8% and Romania and Slovenia with 3.2 and 3%.
- EU15 weighted average use of cashless payment instruments is 135 transactions per inhabitant per year, with France and Finland at the top with 196 and 185, and Greece and Spain at the bottom with 5 and 56 transactions respectively. CCs simple average (excluding Turkey and Bulgaria) give 29 transactions per inhabitant per year, with Cyprus, Czech Republic, Slovenia and Estonia at the top with 61, 55, 50 and 33 transactions respectively.
- EU15 weighted average of ATM usage is 21 transactions per inhabitant per year, with Finland at the top with 47 and Italy at the bottom with 9 transactions. CCs simple average

<sup>22</sup> Which are normally linked to a current bank account and provide access to the funds available at the account

<sup>23</sup> Accounts to which payment can be made, and excluding Austria, Luxembourg and Sweden in calculation



(excluding Turkey) gives 9 transactions with Estonia, Slovenia and Malta at the top with 26, 21 and 19 transactions respectively.

Assuming that the parameters chosen are relevant indicators of the e-banking culture, the above figures show big gaps within EU15, with Finland at the top and Spain at the bottom. They also show that, on average, e-banking culture is less developed in CCs than in EU15, while exceptions exist for countries like Estonia, Slovenia and Malta.

In spite of marketing efforts to promote Internet banking services, significant sector-specific barriers for adoption are identified in CCs, mainly: lower institutional trust in banking actors, lower development and use of financial services (estimated as 50% at most of EU15 average) and lower development of e-banking culture (except for Estonia, Slovenia and Malta).

### **Other socio-economic factors**

Other socio-economic factors, although more general in character and not covered in this research, are likely to influence PC/Internet penetration levels, the degree of usage of banking services in general and the adoption of Internet banking in particular. These also need to be considered for a wide view of the supply/demand dynamics:

- A low degree of trust in institutions can increase privacy concerns when using Internet banking services;
- Low household income levels could be a barrier to PC/Internet penetration at home;
- High inflation rate levels could reduce the degree of use of banking services (savings);
- The existence of a grey economy may reduce the potential of financial services.

### **Growth prospects**

The gap between the number of Internet users and the number of I-bank users (in EU15 71% of Internet users do not use I-banking) suggests that significant room for growth exists in the use of I-banking applications, although target groups are somewhat different as not all Internet users have bank accounts (for example, because of age limitations). Furthermore, additional growth potential exists, as the overall growth in e-finance is likely to follow the PC and Internet usage curve. Similarly, the expansion of delivery channels – for example, wireless networks, PDAs and other non-PC devices such as TV – should enhance e-finance future market growth. However, it is probable that many adopters of these new delivery channels will be current PC-based e-finance users rather than new e-finance users. Thus, the total number of users *may not necessarily increase, as these new channels could become alternatives*.

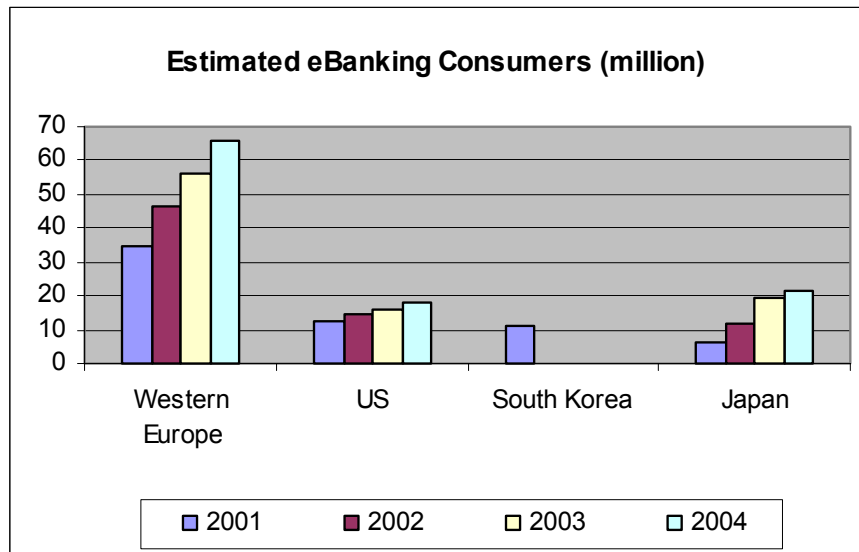
The banks themselves will also stimulate growth in I-banking as they make it possible to conduct more transactions over the Internet. Some of the interviewed banks expect that saturation level will be reached at around 70-80% of the customer base. In CCs, growth potential is even stronger, because of the lower usage of banking services and lower penetration of Internet and I-banking among bank customers, compared to EU15.

According to Deutsche Bank Research (DBR, 2001), the share of online banking could rise from 8.5% to 50% in industrial countries. These averages however hide large differences. In Nordic countries for example, e-finance in banking could reach nearly 80% by 2005, while UK and US penetration would approach just 50%. In emerging markets the share could rise from 1% to 10%, and with better connectivity, it could rise even further, to 20% by 2005. Figure 10 below presents

2001-2004 e-Banking customer uptake estimates for Europe, US, South Korea and Japan, and shows that the western European countries are expected to consolidate their lead in terms of numbers of e-Banking customers.

**Figure 10: e-Banking Customer Uptake, 2001-2004**

Sources: Datamonitor, Sep 2002 (Western Europe: Benelux, France, Germany, Italy, Nordics, Spain, Switzerland, UK); eMarketer Nov 2002 (US); Bank of Korea 2002; IDC 2000 (Japan)



## Mobile banking adoption

In spite of a significant number of banks providing mobile banking services (using WAP on 2G mobile generation, or SMS) both in EU15 and in CCs, *access technology* obstacles, limited *adequacy of technology to the application*, and *service quality*, have limited consumer adoption of the services (DBR, 2002). Factors such as network incompatibilities, reliability and latency of connections, slow transmission speeds, expensive data communications, security weaknesses and device limitations have dampened market interest in using mobile devices for financial applications. WAP penetration in Western Europe<sup>24</sup> has only reached 2.7% of mobile users (end 2000), with low average consumption rates of 10 min/month per WAP user. More specifically, low uptake of mobile financial services has been observed in the UK and in Germany with 14% and 23% of mobile web users using financial services respectively (Digiworld, 2002; Datamonitor, 2002). Consequently, some of the Banks have recently frozen some of the projects<sup>25</sup>, since they failed to achieve the needed critical mass.

Nevertheless, many of these technology constraints are expected to disappear with the introduction of GPRS and later UMTS, and many banks continue to invest in mobile banking projects. However, it remains to be seen, in terms of growth prospects for m-banking, if a mobile banking mass market will be developed. On the one hand, most banking operations are not time critical (ECB, 2002c), and on the other, e-finance users that can afford to or have the motivation and the interest to be active traders, or at the very least, want to know their market position frequently, probably account for a relatively small percentage of the population. As a result, at least in the early stages, mobile finance may remain a niche application for a selected segment of

<sup>24</sup> Germany, UK, France, Italy and Spain

<sup>25</sup> HSBC, Natwest, Erste Bank

e-finance users, and/or for a small niche of operations such as on-line trading and mobile payments (DBR, 2002; Kerem, 2002; Nordea; Christiansen, OECD, 2001).

#### Mobile banking in South Korea

In South Korea, mobile banking was introduced in March 2000, shortly after Internet banking in 1999. By Sep 2001, a significant development of mobile banking was observed, with 18 out of the 20 domestic banks offering mobile banking. Although at that time, the number of Internet users and mobile phone subscribers was similar (+24 million vs. +28 million), usage figures showed a huge difference in the adoption levels. While in Sep 2001, +86 million Internet banking transactions took place, during the same month, only 465,000 (0.5% of Internet transactions) mobile transactions took place, most of them statement services, with less than 1.8% of funds transfers.

In spite of the above predictions, EITO projects that the development of the mobile applications market will be mainly driven by financial services. These represented 98% of the 247 million Euro total revenues in 2001 and revenue estimates for 2006 are of 3.5 billion Euro (EITO, 2002 Part Two, p. 231).

#### Interactive Digital TV banking adoption

According to Forrester Research (2001), leading financial services companies rushed to pioneer iDTV in the UK, but low uptake and *technology limitations* prevented short-term ROI. Concretely, 7% of 11 million UK interactive users use TV banking, technology and lack of consumer interest being among the major development barriers for banks. Furthermore, Forrester advises finance firms to use iDTV to complement other channels because of its many limitations (it is not a good way to convey complex information, such as the details of a mortgage or a life-assurance policy). In order to generate returns from interactive TV, financial firms must use it (Forrester advises) for what it does best: create awareness.<sup>26</sup>

In parallel, the Eurobarometer survey (FEB N125, June 2002) reports a significant decrease in Internet access through cable TV since Nov 2001, in UK, Belgium and Finland. Therefore, iDTV for banking could be considered today as an emerging e-channel, complementary to the PC as a user interface, and is not expected to increase significantly in the short to medium term.

Nevertheless, Forrester Research (2002) predicts that iDTV penetration in Europe will reach 44% of households by 2007, up from 11% today. Four countries will drive iDTV growth: the UK with 45% of Europe's iDTV penetration, and France, Spain and Italy with 44% between them. The rest of Western Europe will account for only 11%. Furthermore, satellite will be the main delivery mechanism (share decreasing nevertheless from 69% to 55% in 2007), as better quality and more channels outweigh satellite's problems of subscribers having to use a phone connection as the return path and relatively high cost. Cable's market share will grow from 23% to 34% and digital terrestrial will only grow from 8% to 11%.

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<sup>26</sup> Forrester Research B.V. "Big Banks Dominate iDTV, 2002" study for which Forrester spoke with 23 of the 33 firms active on interactive TV during November 2001.

## Case studies

### Nordea Bank Group (former Merita) and Finland

*Sources: Nordea, 2002; ECB, 1999a. See Appendix 1 for more detailed information on Nordea Bank and Finland.*

Nordea is the leading financial institution in the Nordic region with operations (including Internet banking) in eight countries: Nordic and Baltic countries and Poland. Nordea has (Sep 2002) +10 million customers, 3.2 million of which are Internet customers. This represents 29% of customer penetration overall, but 65% of active customer penetration (customers who receive regular money flow into the bank).

Nordea has a "high tech" profile. It started electronic banking services back in 1982 with phone banking, has offered PC banking since 1984, mobile banking since 1992, Internet banking since 1996, and GPRS mobile banking since Jan 2002. Introduction of Internet banking services in CCs has taken place in June 2000 in Estonia, in April 2001 in Latvia, in October 2001 in Poland and in May 2002 in Lithuania.

One of Nordea's highest Internet banking penetration rates is in Finland, reaching around 40% of banking customers and 72% of active customers (Sep 2002).

In Finland, Internet banking is third in the list of top applications on the Internet with 65% of Internet users using it, 83% use email and 73% use search for news/topical items (Flash Eurobarometer 112, 11/2001).

The following factors have positively contributed to the strong Internet banking development in Finland:

#### *Access related factors:*

- IT companies may have played an important role in the development of PC penetration, when they paid for a home PC and connection costs for employees needing to work from home, or bought a portable PC for 'mobile' employees or for tele-working purposes.
- Internet access from the workplace has been the main reason underlying the rapid growth of the Internet banking service, which has been accessible from the home *and* the office. Solo (Nordea's Internet banking service name) has always been accessible from home, the office or abroad. In Finland, workplace use has meant rapid growth of the service, with users becoming accustomed to using information systems as far back as the mid-1980s.
- Since 1999 Finland has achieved the 30% Internet penetration threshold. Current penetration rates are among the highest in Europe with 56.1% of users per 100 inhabitants in 03/2001 vs. 30.2% in EU15 (Eurostat Pocketbook, 2002).

#### *e-Banking culture factors:*

- Since the 1990's, Finnish banks have encouraged (with price incentives) retail customers to use cheaper remote channels, scaling down their branch network and halving the number of employees in seven years. The introduction of multipurpose ATMs and telephone banking early 1990's has been followed by the introduction of the cheaper Internet banking channel in 1995 (ECB, 1999a).
- Finland is the country in EU15 with least cash in circulation (2.2% of GDP, less than half of EU15 average) and with a strong tradition in using electronic payment instruments with 185 transactions per year per inhabitant, 37% above EU15 average (ECB, Blue Book, 2000).
- In spite of lower than EU15 average number of ATMs per inhabitant, the Finns are the EU15 top users of ATM cash services, with 47 transactions per year per inhabitant compared to EU15 average of 21 (ECB, Blue Book, 2000).

⇒ Following Bughin's supply-demand model (Bughin, 2001), we could assume that the combination in Finland of both pull (high Internet penetration) and push factors (banks' cost-efficiency strategies, history of using electronic channels and pricing schemes) creating a strong e-banking culture, have been the drivers for a strong and fast adoption of Internet banking.

## South Korea

Sources: Bank of Korea, Korea Internet White Paper 2002. See Appendix 1 for more detailed information.

South Korea has experienced fast adoption of the Internet banking service, following its introduction in 1999, with 20 domestic banks, Citibank and the post offices offering the service by Sep 2001.

By the end of 2001 over 11 million people used Internet banking services, representing more than 24% of the population and a growth of 280% compared to users in 2000. The channel distribution (as a percentage of transactions) is: branches (42%), ATM (37%), Phone (12%) and Internet (9%). The percentage share of Internet transactions is growing, which indicates that use of electronic delivery channels is becoming a habit.

The major adoption factors have been:

- High rate of Internet users: by July 2002, South Korea had over 25 million Internet users, representing more than 53% of the population (Ministry of Information and Communication). As early as the beginning of 2000 penetration was 30%. Furthermore, South Korea has the highest rate of broadband Internet subscriptions (among all members of OECD) with over 7.8 million houses subscribing to high-speed broadband services.
- Convenience
- Bank marketing efforts: discounted fees, better deposit rates, lower loan rates.

It could be concluded that, as in Finland, the combination of "push" factors such as intensive and attractive offers by banks and post offices and a history in the availability and use of electronic delivery channels, together with "pull" factors, such as a strong Internet penetration have created very favourable conditions for adoption. In only three years, South Korea has achieved a penetration of 24% of the population, ranking third in the world.

## Estonia and Hansabank

Source: Kalkun et al. Praxis, EMOR, 2002; IDC, 2002; Foundation Archimedes, Nov 2001; Baltic IT Review Magazine, 4'2000, Eurostat. See Appendix 1 for more detailed information on Estonia and Hansabank.

Estonia leads the CCs in Internet banking. 18-25% of the Estonian population used Internet banking in 2001 (UNCTAD, 2002; Archimedes, 2002; Kerem, 2003), a higher rate than European average of 10%.

Rates for Internet access from home in Estonia are comparatively low (10% in 2001 compared to 38% in EU). However, the combination of strong Internet access penetration at work (61% vs. 63% in EU), the emphasis on Internet skills development together with a well developed Internet banking offer, have led to the following penetration levels:

	Estonia	EU15 average
Internet users, in 2001 (% of population)	33%	30%
Internet banking in 2001 (% of population)	18-25%	10% (excluding A, Gr, Irl, P)

This indicates the important role of enterprises in developing Internet literacy and usage within the country (similar indications exist in Finland and Sweden). However, if PC and Internet penetration at home do not increase, this could be a barrier to Internet penetration overall, as a significant percentage of non-users either do not work or do not make use of computers at work, or may not be willing or able to use the Public Access Points.

Additionally, further analysis would be required to better understand the reasons for the low level of consumer e-commerce take-up, limited to 2% of the population, compared to 35% in EU15 (FEB 112, Nov 2001).

Looking at the bank supply side, in 1988 the first commercial bank was established in Estonia (Tartu). Since 1993, credit cards and PC banking have been on offer and since 1994, phone banking and ATM bank cards have been operational in Estonia. Internet banking started in 1996, leading to the current high penetration levels, 6 years later.

Estonia's e-banking culture parameters, such as the number of electronic transactions per person per year (33) and the number of ATM transactions per inhabitant per year (26), are above EU15 average and indicate a significant level of development.

*Hansabank* is the biggest bank and market leader in the Baltic Region. It has a 70% share of the Estonian retail market and claims to have 388,000 Internet users (Sep 2002), representing 37% of bank customers. It is interesting to note that the bank seeks profitability in the long term only, and sees the low PC and Internet literacy and penetration as a barrier for Internet banking development. Consequently, Hansabank has sponsored the look@world public-private initiative, which aims at increasing PC and Internet literacy by providing free Internet courses to 100,000 non users.

The following table provides a summary of factors influencing I-banking adoption in Estonia:

<u>Access infrastructure related factors</u>	<u>Internet banking factors</u>
<ul style="list-style-type: none"> <li>&gt; Low mainline density a concern</li> <li>&gt; Low Internet penetration at home</li> <li>&gt; High Internet penetration at work</li> <li>&gt; High Internet penetration</li> <li>&gt; Focus on Internet skills</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Strong e-banking services offer</li> <li>&gt; High ATM usage</li> <li>&gt; Relatively high usage of cash-less payment instruments</li> </ul>

## Summary of findings

The lack of available public and official data presents significant methodological limitations.

Consumer motivation to use Internet banking is a combination of elements such as freedom of time and space, speed, convenience, 24 hours a day availability and price incentives. Experience shows that consumers use the Internet as a complementary channel and continue to rely on branches and call centres. The role of branches and call centres is evolving to more advisory and selling functions.

The European<sup>27</sup> average for Internet banking adoption is estimated at 13% of the total population (Datamonitor, 2002) and 39% of Internet users (end 2002) with important northern – southern country variances. The CC adoption average is very low and far behind that of the EU, in spite of all the major banks offering the services. Also huge variances between the CCs are reported, with Estonia at the top with 18-25% of the population, whereas in Malta services have only recently been launched (Dec 2002).

Adoption is influenced by a complex set of different aspects, including access technology and infrastructure related factors, sector-specific Internet banking factors and other socio-economic factors.

The analysis shows that development of a service by the banks is not sufficient, on its own, to ensure adoption. Access infrastructure to the service seems to be a pre-requisite and access at home may be a relevant factor. Time and trust are needed to convert consumers to the use of e-delivery channels, among which Internet is one. Internet penetration is even regarded as having a strong “pull” influence, and the threshold of 30% is identified as a take-off factor. The analysis of success stories show that a developed e-banking culture and a strong push of e-banking services in general and Internet banking in particular, together with a high Internet penetration create favourable conditions for a faster and wider adoption of Internet banking.

The most important potential barriers for development of Internet banking in CCs have been identified as being the low PC and Internet penetration in general, and particularly at home, considered a pre-requisite for Internet banking development. Consumer security and privacy concerns are also reported as an important potential barrier, possibly aggravated by the aftermath of Sep11, with increasing power by authorities to control. Other sector-specific barriers expected to limit the potential and pace of development growth of Internet banking in the short to medium term are: less trust in banking institutions, less development and use of financial services, and less development of e-banking culture (except for Estonia, Slovenia and Malta for the latter). Therefore, though growth potential is predicted in CCs, its speed of development is uncertain given the barriers identified.

A low take-up level of mobile and iDTV banking is observed, due to access technology barriers, limitation of the devices and the quality of service. Although some of these barriers are expected to decrease with technology evolution, they will probably limit in the short to medium term the use of these channels to complementary niche applications addressing the needs of limited customer segments. The PC remains, so far, the most user-friendly interface for this type of application.

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<sup>27</sup> EU countries excluding Austria, Greece, Ireland and Portugal

## 4. Key issues in CCs for Internet banking adoption

Through the analysis of the factors that influence the Internet banking adoption, specific issues have been identified in CCs for Internet banking adoption, indicated in the Table 3 below in bold.

**Table 3: Specific issues identified in CCs for Internet banking**

Access technology and infrastructure related factors	Sector specific Internet banking factors	Other socio-economic factors
<b>Penetration (PC, Internet)</b> Skills (PC, Internet) Attitude towards technology <b>Security and privacy concerns</b>	<b>Trust in banking institutions</b> <b>Banking culture</b> <b>e-banking culture</b> Internet banking push	Institutional trust Household income level Inflation rate Level of grey economy

In this chapter, two of the access technology and infrastructure related barriers for Internet adoption in the CCs are further analysed, in particular the lack of PC/Internet penetration at home and the consumer security and privacy concerns, as these may affect the adoption of Internet services in general.

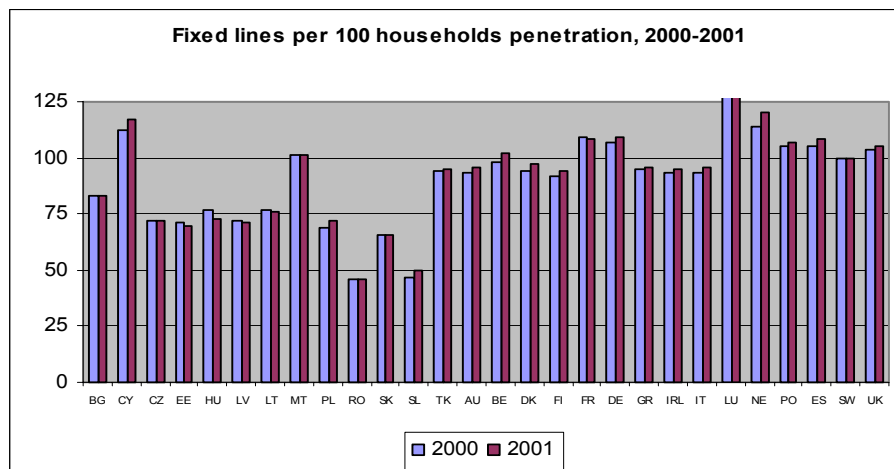
### Limited PC/Internet penetration at home

In order to better understand the issues related to the limited PC/Internet penetration at home, a more detailed analysis of the telecommunication access technologies and infrastructure in the CCs has been carried out. We start by analysing fixed telecommunication lines (in many cases these are in the hands of to-be-liberalised monopolies), the penetration of mobile subscriptions and alternative access technologies such as Cable TV and Wireless Fixed Access.

Dial-up is the dominant technology for accessing the Internet in Central and Eastern Europe (EITO 2002, Part One 1.3.8 Internet Market; eEurope+, 2002). Figure 11 below illustrates the current penetration of fixed lines per household. It shows that there is a stagnation of fixed line penetration in most countries at around 75% (except for Cyprus and Malta). This stagnating low penetration has been reported as a concern in Estonia and Lithuania, as it may be a major barrier for Internet use. Particularly in Lithuania, it is reported as the major barrier for Internet penetration at home.

**Figure 11: Fixed lines per household in CCs and EU15.**

*Source: IDC, 2002; Notes: Fixed lines include ISDN; Luxembourg out of scale (221-240%)*





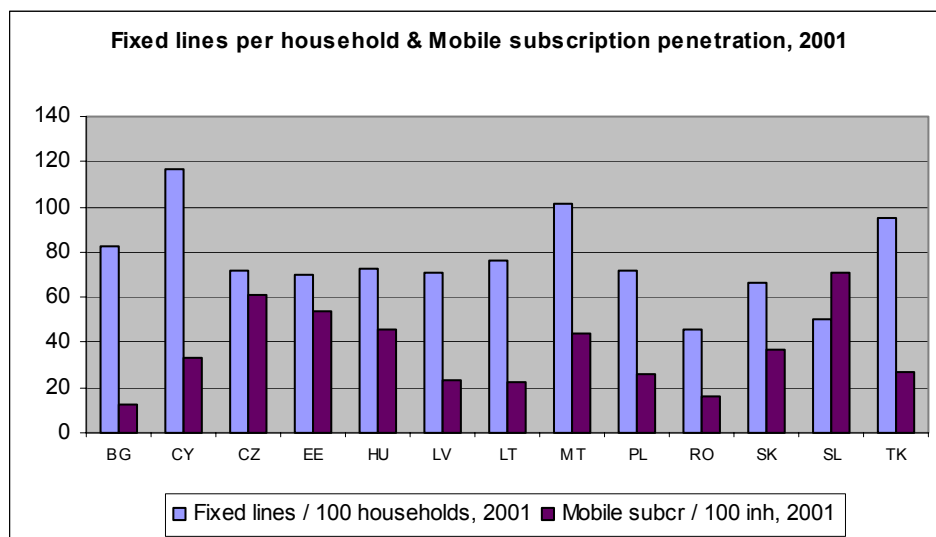
In addition, the existing fixed lines infrastructures present technical limitations that constrain their use for Internet: remaining analogue exchanges, dial-up failure rates ranging between 10 - 30% in some countries, existence of 'shared-lines' unsuitable for Internet connection, low bandwidth that generates unacceptable response rates and strong urban-rural differences reaching 100%-0% penetration levels (eEurope+, 2002).

This limited fixed line penetration together with long subscription waiting lists in some countries such as Bulgaria, Estonia, Latvia, Poland and Romania (EITO, 2002; Eurostat) is an incentive for mobile subscription development, which also has cheaper development costs. Mobile subscriptions are rapidly catching-up or even overtaking fixed line penetration (in absolute numbers) in most of the countries. As an alternative means for voice transmission, mobile phones provide an opportunity for leapfrogging to achieve the objective of increasing access to the telephone network as a universal service. In some countries fixed telephony penetration rates have even dropped as subscribers cease using fixed telephony in favour of mobile (eEurope+, 2002).

Figure 12 illustrates the current penetration of mobile subscriptions<sup>28</sup>, which has overtaken household fixed line penetration in Slovenia, and is coming close to doing so in the Czech Republic, Estonia and Hungary.

**Figure 12: Fixed lines per household vs. mobile subscriptions in CCs**

*Source: IDC, 2002; Note: Fixed lines include ISDN.*



In spite of the leapfrogging opportunities mobile technology offers for voice communications, there is a risk that its high penetration may limit demand for fixed line telephony in CCs (except in Cyprus and Malta), slowing down further investment in fixed line networks, particularly in rural areas. Furthermore, the low take-up levels observed for mobile banking due to access technology obstacles and device limitations indicate that mobile technologies and devices do not yet offer convenient Internet access for banking in particular, and for other Internet applications

<sup>28</sup> Considering that all household inhabitants have access to the fixed line, it was considered more appropriate to compare fixed line penetration per household with mobile subscription penetration per inhabitant.

in general. In Europe, eEurope 2002 benchmarking<sup>29</sup> reports that Internet access through mobile devices remains marginal.

**South Korea mobile Internet (Korea Internet White Paper 2002)**

The Mobile Internet market is growing explosively among teenagers and young adults. Mobile phones and PDAs are popular ways for people to connect to the Internet. The mobile Internet has become a new trend where many people are downloading *ring tones, games and cute characters* into their mobile phones.

Further analysis shows that alternative Internet access technologies<sup>30</sup> such as broadband DSL, broadband cable modem (through Cable TV infrastructure)<sup>31</sup>, broadband fixed wireless access, satellite systems and iDTV, represent between 0% and 7% of the Internet connections in CCs except in Estonia and Malta, which have 20% and 30% (IDC, 2002; EITO, 2002, Part One 1.3.8 Internet Market). CATV could offer a significant opportunity for Internet broadband access, as on average, 62% of CC households are “passed” by CATV networks (IDC, 2002). However, its availability has not yet been exploited on any scale for accessing the Internet (eEurope+, 2002). Licences for Fixed Wireless Access (FWA) have been issued in several countries, allowing ISPs to set up their own wireless networks and bypass the incumbent networks. However, FWA Internet access services are targeted primarily at business users, as the technology is too costly for residential customers (EITO 2002, Part One 1.3.8 Internet Market). Nevertheless, the alternative technologies still offer a potential for leapfrogging infrastructure deficiencies as their broadband capacity, together with the increased competition that may appear, could create faster and cheaper access to the Internet (Gourova et al., 2002).

Furthermore, EITO (2002) reports that PC penetration in both homes and businesses remains relatively low in many Central and Eastern European countries and there is no realistic alternative to PCs for Internet access in the CEE region at this time. Internet use would be aided by lower PC prices or by the emergence of alternative Internet access devices. Until then, low PC penetration will hamper Internet market development (EITO 2002, Part One 1.3.8 Internet Market). The Eurobarometer (Flash EB N125, June 2002) consumer survey shows that, at least in the short and medium term, the PC remains the preferred user interface, with 98% of the people interviewed using PC interface to access the Internet. Despite available alternative access terminals, their use has hardly changed in the last year: 2% used iTV, 4% used mobile WAP or GPRS (down from 5.8%), 1% used handheld/pocket computers.

It can be concluded that fixed lines technical limitations and limited and stagnating penetration, potentially hindered by the fast and widespread take-up of mobile subscriptions, together with the very low penetration of alternative Internet access technologies, networks and devices (broadband DSL, CATV, FWA) may represent a potential bottleneck for short to medium term Internet penetration development in CCs.

<sup>29</sup> The communication (COM(2002)96 final, 21.2.2002) of the Commission to the Council and the European Parliament “Next generation Internet – Priorities for action in migrating to the new Internet protocol Ipv6”

<sup>30</sup> The eEurope+ Action Plan states that “The Candidate Countries must find ways, consistent with the acquis, to ensure that all citizens have access to good quality and affordable telecom services. The solution will probably not rely so heavily only on the fixed networks as was the case in EU countries but rather on a variety of technologies (eg. Fixed, wireless, cable). EEurope+ is an Action Plan prepared by the Candidate Countries with the assistance of the European Commission, June 2001.

<sup>31</sup> Although CATV is quite extended in CC13 with many differences (from 0% up to 23% of population) and CATV networks can be used to deliver broadband Internet access if they have been upgraded to handle bi-directional traffic, only portions of the more heavily cabled countries have had these upgrades. Indeed, cable operators are very fragmented in CCs and many lack the investment to provide two-way communication for interactive services. However, the fact that there is a last mile connection owned by other than the incumbent operator, offers potential for competition in the local loop (Gourova et al., 2002; IDC, 2002).

## Consumer security and privacy concerns

There is very limited and only anecdotal evidence on consumer security and privacy concerns in CCs about the use of Internet banking (see Chapter 3, Footnote 19). For the purposes of this analysis, available data on e-commerce could be taken as an additional reference, although consumers may be more sensitive to on-line banking risks than to the risks of purchasing a book or CD (GVU, 1999; Lohse, 2000). On the other hand, customers may have more trust when transacting on-line with their own bank than with a merchant. Bearing this in mind, e-commerce consumer surveys<sup>32</sup> report that for 37% of Internet users, security concerns are the major reasons for not purchasing on-line in CCs, compared to 30% in EU15.

Consumer security concerns may be justified, as indicated by the following:

- Serious operational risks and potential liabilities are associated with security breaches in the transfer of funds or instructions and the actual theft of identification information over the Internet (Furst, Glaessner, and Kellerman 2001).
- The 2002 US CSI/FBI Computer Crime and Security Survey reports that 70% of respondents' sites suffered from vandalism attacks, where 12% included theft of transaction information and 6% financial fraud.
- Identity theft is a worrying trend. The US Treasury's Financial Crimes Enforcement Network reports a 2001/2000 increase of cases of Identity theft of 50% and experts estimate that it will triple between 2000-2005, with 1.5 million cases expected in the US.<sup>33</sup> Furthermore, bank systems and services are important targets among fraudsters<sup>34</sup> with 42% of cases related to credit card fraud (26% to new accounts and 10% to existing accounts), 20% to phone or utility bills, 13% to bank fraud, and 7% to loan fraud.

In relation to privacy concerns, even before September 11, citizens' concerns regarding the protection of their personal data were reported to be a potential bottleneck in the development of the Information Society (European Commission, DG JRC – IPTS, 2001). In particular, e-finance related innovations make it possible to stratify customers through electronic customer relationship management and to individually customize financial service products. These developments can create risks for consumers. For example, information from an online bank account could be misused in others parts of a financial institution or elsewhere (Claessens et al., 2001). Privacy concerns may be amplified in a society which has lower trust in institutions and is more sensitive to the risks of an Orwellian world.

In spite of the above, and in spite of lower trust in banking institutions in CCs, we can observe that banks or bank card operators<sup>35</sup> are acting as identification/authentication gateways in their operating countries and offer, through their portals, access to e-commerce and third party services, such as tax payment, insurance services, electricity bill management, etc. In these cases, banks are acting as trusted parties. This may indicate that banks may have an important role to play in building security and trust on the Internet. However, additional research would be required to understand how far the banks could contribute and what actions could be taken to stimulate such trust. Further research in this area should also include the potential benefits that public-private co-operation in this area would create, and additional privacy concerns that could be generated.

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<sup>32</sup> Taylor Nelson Sofres Interactive, 2002

<sup>33</sup> Celent, 2001; US FTC, 2001

<sup>34</sup> Reported by US FTC

<sup>35</sup> Erste Bank, Nordea, Hansabank, and BORICA (Bank Card Payment Processor, Bulgaria)

On the other hand, research on e-commerce (Centeno, 2002b) shows that both technological and non-technological factors contribute to building consumer trust. Indeed, elements such as consumer awareness and education, web service usability, security and privacy protection, consumer protection in case of fraud or technical problems (liability limitation), easily accessible and cheap mechanisms for redressing disputes are key factors. Similarities may exist with Internet banking services and a better understanding of the status and impact of these non-technological aspects in building trust as well as potential policy actions may be a way forward.

## 5. Lessons learned for other sectors' Internet services

The analysis of supply and demand dynamics in the I-banking case reveals the importance of demand in the development of the IS. Though the context for I-banking is particularly favourable, it shows that its development and adoption is not an easy task, as it encompasses a number of context specific (infrastructure, access technology and socio-economic) and sector-specific (I-banking) challenges. Similar challenges are likely to arise in other IS service segments (e-government, e-administration, e-health), and the same potential policy options for the development of the IS could apply.

On the supply side, the low PC/Internet penetration could affect the development of other e-business sectors, as more limited consumer demand would increase the period necessary to achieve profitability and could hinder enterprises' capacity to invest, creating a chicken and egg problem. In other words, Internet services could develop slowly, and this in turn could slow the growth of consumer interest in adopting and using Internet. Indeed, in EU15, although businesses increasingly perceive e-business as a strategic value proposition and a key competitive differentiator, the financial constraints hamper the speed with which organisations are adopting Internet (EITO, 2002). Given the economic uncertainty, budget constraints are putting a brake on investments in e-business projects. Most of these projects now aim strictly at cost reduction and ROI is cautiously evaluated. It is expected that these contextual conditions would be similar, if not worse, in CCs. With this in mind, the case of Internet bank services may be considered to be a favourable one if compared to e-business services provided by other enterprises (particularly SMEs) with more limited capabilities to recover investments due to lower or very limited economies of scale (e-business W@tch, 2002). This may help to explain why retail Internet banking is one of the most developed Internet services in CCs.

On the demand side, the technological and socio-economic context specific adoption factors listed in the following Table 4, would be, in general terms, also applicable to other Internet services, as they consist of factors which have an influence on the degree of Internet penetration in society as a whole. Consequently, policies addressing these related challenges would be expected to affect the degree of adoption of Internet services across different sectors.

**Table 4: General Internet services adoption factors**

Access technology and infrastructure related factors	Other socio- economic factors
Penetration (PC, Internet) Skills (PC, Internet) Attitude towards technology Security and privacy concerns	Institutional trust Household income level Inflation rate Level of grey economy

Finally, the sector-specific (I-banking) drivers and barriers point at the need to address the sector characteristics and consumer/citizen motivation, in order to stimulate demand, as the supply side alone does not suffice for ensuring the adoption. The individual user set of "motivating drivers and barriers" linked to a specific application is expected to have different ingredients in each sector. Understanding and addressing these different ingredients are key for the stimulation of demand. Furthermore, the I-banking case shows that a number of factors such as culture, trust and habits are expected to play an important role in the speed of the development of the Information Society, and possibly across sectors.

## 6. Potential policy options

In the previous chapters, potential barriers for the development of the IS in general and I-banking in particular have been identified and further analysed. These barriers are determined by a number of adoption factors that have been classified into Internet infrastructure and access technology related (context specific) as well as Internet banking (sector-specific) related factors. In this chapter we consider a number of potential policy options that would address the set of barriers identified, to stimulate the use of the Internet in general, and the use of Internet-based services in particular.

Potential policy actions in the area of Internet infrastructure and access technology could aim at reducing barriers and stimulating the use of the Internet in general. Potential policy options could be:

- Governments could take action to stimulate the development of fixed line penetration;
- Private-public co-operation could address the promotion of research, development, standardization and deployment of emerging alternative PC based Internet access technologies such as broadband DSL, CATV, FWA;
- Private-public co-operation could take the form of action to stimulate the demand including the increase of PC and Internet penetration and education at schools at different education levels. It could also develop vocational training and other specific training methods to train older people and those people who have not had the opportunity to obtain Internet education at school or at work;
- Public-private co-operation could take action to develop positive Internet technology attitudes, through general public awareness campaigns.

Sector-specific demand barriers observed in the I-banking case suggest additional potential policy options to stimulate the use of Internet-based services:

- Government institutions could increase the use, supply and promotion of electronic services. E-government, e-administration, e-health initiatives could stimulate the use of Internet services among the population, and the development of an e-culture and habit. As an example, government institutions' use of e-payment services for public purposes (salaries, taxation schemes, etc), may stimulate the adoption of e-banking services such as Internet banking by citizens and enterprises;
- Governments could encourage development of Internet services at post offices, which in most CCs play a very active role, with a high number of branches, in the provision of a variety of services, including financial services;
- In order to increase security and consumer trust, policy options could address elements such as consumer awareness and education, consumer privacy protection, consumer protection in cases of fraud or technical problems (liability limitation) and easily accessible and cheap mechanisms for redressing disputes;
- The public sector, in co-operation with the private sector, could encourage the development of official statistics on Internet based services.

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## Appendix 1: Case Studies detailed information

### Country case study: Sweden (Source SBA, presentation to the ECOFIN)

#### History:

1996 First Internet service launched  
1999 1 million customers  
2000 2,7 million customers (pop 8.9 million)

#### Market figures (end 2000):

- 30% of customers use the banks' Internet services regularly
- Most widely used services:
  - Payment of bills (1/3<sup>rd</sup> of all Swedes)
  - Transfer of money between accounts
  - Purchase and sale of units in mutual funds
  - Purchase and sale of securities
  - Sale of mortgage credits
  - Advice and information

#### Country (Sweden) contextual information:

- In the early days of the web, the Swedish government decided to try and ensure that there was a PC in every Swedish household by using substantial subsidies – the PC initiative formed part of a broader programme that invested heavily in human resources, education and other areas of IT (Source: SEB, Stuart Sinclair, Head of Strategy, e-banking)
- Sweden has +50% of the population with mobile phones, with PCs at home and with access to Internet.

#### Trends / vision:

- A trend to financial department stores
- New channels as 3G mobile phones and digital TV will develop online banking even more.

#### Effects of Internet banking:

- Cost of payment via Internet is 1/10<sup>th</sup> of the cost of paper-based giro payment.
- Reduced importance of nr. of branches as a competitive factor. Helps the introduction in a new country, with a reduced nr. of branches. Many banks and other financial institutions have expanded in this way and these new establishments have already important competitive effects on the financial markets.
- A new type of branch is beginning to emerge, one that concentrates solely on advisory services and the provision of information about the banks' facilities.
- Internet banking has improved efficiency, made it possible to develop new services, increased competition and increased customers' satisfaction.

## Country case study: South Korea (Sources: Bank of Korea; Korea Internet White Paper 2002)

### General

Koolmin Bank, South Korea's leading online bank controls 24% of the online banking market. Chohung Bank, Hanvit Bank and National Agricultural Cooperative Federation, collectively account for 35% of the online banking market.

### History

- 1999 Internet banking introduced
- Mar 2000 6 banks offer *mobile* Internet banking
- end 2000 17 banks offer *mobile* Internet banking
- Sep 2001 20 domestic banks, Citibank and post offices offer Internet banking  
18 banks offer *mobile* Internet banking
- Internet services offered cover: basic banking, credit and investment services and 3<sup>rd</sup> party services such as EBPP (Electronic Bill Presentment and Payment) and account aggregation.

### Key facts and figures

- end 2000 4 million Internet banking users
- Sep 2001 8.95 millions Internet banking users  
302,000 Internet banking corporate users  
473,000 mobile transactions
- end 2001 11.31 million Internet banking users (+280% / 2000)  
24.2 % of population  
3<sup>rd</sup> country in the world after Sweden (29.4%) and Norway (28%)
- Usage growth trend is bigger than usage growth of CD/ATM or telephone banking.
- Channel distribution (% of transactions): Branch 42.2%, CD/ATM 37.1%, Phone 11.8%, Internet 8.8%
- Internet banking service usage, Sep 2001
  - Transactions
    - 72 million statement services (saldo queries?)
    - 14 million fund transfers (relation 1:5 to statement services)
    - 337,000 loan applications
  - % of Internet banking subscribers using service
    - 50.9% check balance in savings account
    - 42.3% wire transfers
    - 2.7% bank account services
    - 1.9% loan services
    - 1.8% international wire
    - 0.4% other
- Mobile banking service usage, Sep 2001
  - Transactions
    - 465,150 statement services
    - 8,152 funds transfers (small, equivalent to a daily average of 18 transfer per bank)

### Consumer drivers for adoption:

- High rate of Internet users
- Convenience
- Bank marketing efforts: discounted fees, better deposit rates, lower loan rates.

### Context information

- By end of 2001, there were +24 million Internet users, or 56% of the population.
- World's highest rate of broadband Internet subscribers (among all members of OECD) with +7.8 million houses are subscribed to high-speed broadband services.

### Internet penetration (NUA):

Date	Pop	%	Source
Jul 2002	25.6 million	53.8	Ministry of Information and Communication
Jul 2001	22.23 million	46.4	Korea Network Information Center
Apr 2001	20.93 million	43.69	Ministry of Information and Communication

Jan 2001	19.04 million	39.75	Korea Network Information Center
Oct 2000	16.4 million	34.55	Korea Network Information Center
Jul 2000	15.3 million	32.31	Ministry of Information and Communication
Dec 1999	10 million	21.33	The Korean Herald
May 1999	4 million	8.53	Samsung Economic Research Institute
Jan 1999	3.1 million	6.7	National Computerisation Agency
Nov 1998	1.8 million	3.9	IDC Asia Pacific
Feb 1997	700,000	1.53	Inet, Inc.

## Country case study: Estonia

Source: Praxis, EMOR, 2002; IDC, 2002; Foundation Archimedes, Nov 2001; Baltic IT Review Magazine, 4'2000, Eurostat, EITO 2002

### ICT Context

- Population: 1.370.600 (2001)
- Main lines density is still a matter of concern (37 lines per 100 inh, in 2001, vs. 56 in EU)
- Leads the way for telecom liberalization in the Baltic States. Successful country in CEE launching new telecom technologies 54% of mobile penetration, 16% of DSL broadband Internet connections, 2.2% of broadband cable modem and 1.2% of Broadband Fixed Wireless Access (higher than EU levels).
- Household PC penetration has grown rapidly but still low (15% 1999, 19% 2000, 26% 2001); cost is a barrier.
- Low school computerization level with 3.82 computers pr 100 pupils at primary and secondary levels in 2000, vs. 9.05 EU average. TIGER Lead education project since 1997 to equip 100% of schools with Internet. Results are that Internet users are younger than the rest of the world.
- Internet penetration at home is low: 7% in 2000 and 10% in 2001 (Eurostat), compared to 38% in EU (FEB, 112, Nov 2001)
- Internet usage is high and remains quite stable: 33% in 2001; 410,000 persons, 39% persons (15-74) in 2002 (Emor, 2002), compared to 30% in EU (Eurostat 2001);
- [Look@World](#) Foundation project, private-public co-operation to increase the number of Internet users in Estonia, which provides free Internet short-term training courses to 100,000 non-users (9.5% of population 15-74).
- Place of access: 53% from work, 40% from home, 29% school / University, 23% acquaintance's workplace or home, 15% PIAP (Praxis, Emor, 2002)

### Barriers for Internet adoption development :

- Motivational issues ("not for me", need personal contact, lack of information content), lack of skills, and access issues (PIAP unattractive, low penetration of main lines at home)

### Internet banking market figures:

- Most developed banking systems of the Baltic States, with four banks providing Internet banking services. Leading Bank is Hansabank.
- Estimated Internet banking users, between 18-25% of the population (UNCTAD, 2002; Archimedes, 2002). Penetration figures in terms of % of banking customers are available for Hanzabank 37% in 2001; penetration figures in terms of Internet users is 61%, compared to EU 29% (FEB 112, Nov 2001).

### e-commerce market figures:

- Online shopping still low, with 2% of population (15-74) in 2001, or 6% of Internet users, compared to 35% in EU (FEB 112, Nov 2001).
- Reasons for not shopping are more lack of interest (41%) than security concerns (30%)
- For businesses, major obstacle is high credit card fraud (Estonia has been in the black list). Retailers have invested little. Low credit card penetration. As a solution banks offer payment service.

### Conclusions Estonia:

In spite of the low penetration of Internet access from home (10% in 2001 compared to 38% in EU), the combination of strong Internet access penetration at work (61% vs. 63% in EU), the emphasis on Internet skills development together with a well developed Internet banking offer, leads to penetration levels of:

	Estonia	EU average
Internet users, in 2001 (% of population)	33%	30% (Eurostat)
Internet banking in 2001 (% of population)	18-25%	10% (UNCTAD, Archim, Datamonitor)
Hansabank on-line customers penetration, 2001	37%	20% (Hansabank, Forrester)

This points at the important role of the enterprises in the Internet literacy and degree of use within the country (similar conclusions are deducted in Sweden). However, there seems to be a barrier in Internet penetration without increasing PC and Internet penetration at home, as a significant percentage of the population either does not work or does not make use of computers at work, or do not wish or can not use PIAP. Additionally, further analysis would be required to better understand the reasons for the low level of consumer e-commerce, limited to 2% of the population, compared to 35% in EU (FEB 112, Nov 2001).

## Bank case study: Nordea Bank Group (former Merita) (Source: Nordea, Tainio, VP, 2002)

### History (Finland):

- Phone banking 1982
- PC banking 1984
- Stock trading 1988
- Banking from mobile 1992
- Internet banking 1996
- TV banking 1998
- WAP mobile banking Oct 1999
- GPRS mobile banking Jan 2002

### Market figures (Sep 2002):

- Countries of operation: Finland, Sweden, Norway, Denmark, Estonia, Latvia, Lithuania, Poland

	DK	FI	NO	SE	Bal&Pol	Total
Bank customers ('1000)						
– individuals	1,700	3,000	500	4,260	60	9,500
– corporate	80	330	65	460	10	950
<b>Internet bank customers ('1000)</b>	<b>410</b>	<b>1,200</b>	<b>240</b>	<b>1,300</b>	<b>15</b>	<b>3,170</b>
– individual	378	1,123	169	1,201	12	2,884
– corporate	30	70	35	91	3	229
Bank customer penetration %						29
<b>Active personal cust penetration %</b>	<b>40</b>	<b>72</b>	<b>57</b>	<b>68</b>		<b>64.6</b>

- Volume of transactions: 9 million accesses / month, 9 million payments / month (+28% and 40% annual growth 2001/2000 respectively)
- Number of offices (%??) has been shut down as a consequence of the success of Internet banking

### Country (Finland) contextual information:

- Nordea home markets have the highest mobile penetration rates.
- In Finland (FEB112 11/2001), top 3 uses of Internet are: email (83%), news/topical items (73%) and Internet bank (64.8%)
- IT companies may have had an important role in the development of PC penetration as these pay for a home PC and connection costs for employees who would need to work from home or would buy a portable PC for those 'mobile' employees or for tele-working purposes
- Workplace has been the main reason underlying the rapid growth of the service, as Solo (Nordea's e-banking services name) has been accessible from the home and the office.

### Services offered:

- Services offered cover basic banking, credit and investment products, including convenience services. Latest services include e-commerce payments, e-invoicing, e-ID and e-Signature and electronic salary.
- Although the Solo logo and concept is copied from country to country, it is not completely identical in the different countries.
- Services are equally accessible from a normal telephone, a mobile phone, a WAP phone, a PC or a television fitted with an Internet adapter.

### Future trends / vision:

- Since 1999, Nordea has been carrying out a pilot project with Nokia and VISA, making use of WAP technology, local wireless communication technologies such as Infra-red and Bluetooth, and a dual chip architecture, with the aim of improving the security of the wireless services, such as payments.
- Achieving a critical mass (increasing user base) is a key factor
- Wired banking is increasingly becoming wireless, and will include mobile card payment services

## Bank case study: Hansabank in Baltic Region (Source Hansabank, Nov 2002)

### General data

- Biggest bank and market leader in the Baltic Region
- Countries of operation and market share (2003): Estonia (70%), Latvia (18%), Lithuania (30%)
- Owned by Swedbank (Swedish Föreningssparbanken) since 1998
- e-bank started in 1997 (Hoiupank in autumn 1996)
- Employs 5,754 people (Sep 2001), 50 people working for Internet banking
- Has 2,9 million customers (Sep 2001)
- Strategy summary:
  - Universal bank total customer relationship
  - Clicks and bricks strategy
  - Local approach (language, legislation, co-operation partners), with similar but not identical IT systems
  - Offer all existing financial products and also new products in Internet (one offer / all channels)
  - Added value through 3<sup>rd</sup> party products
  - Automated back-office – lower costs
  - Increase Internet access: [look@world](#) (private-public project to increase # on Internet users)
- Profitability, a long term objective

### History

	Estonia	Latvia	Lithuania
• Phone banking	1994	1997	2002
• PC banking	1993	2000	1999
• Internet banking	1996	2000	2000
• WAP mobile banking	2000		
• SMS mobile banking		2001	2002

### Market figures

	Estonia	Latvia	Lithuania
• Internet banking penetration			
% of bank cust, end 2002	~37%	~46%	~5%
Users (Sep 2002)	388.000	123.000	124.500
Log-ins ('000, Sep 2001)	1.021	194	18
Payments ('000, Sep 2001)	704	74	2
<i>Relation Payment:Log-in</i>	2:3	2:5	1:9

### Services offered:

- Services offered cover basic banking, credit and investment products, traffic insurance contract with partner in Estonia, 3<sup>rd</sup> party services such as shopping, tax declaration, e-bill payment, management of utility accounts, and convenience services such as mobile banking, SMS alerts and email. Other services include m-payment and account balance over IVR (Interactive Voice Recognition).
- Different level of service development and offering per country, with Estonia the most developed offer.

### Bank drivers for development:

- Cost reduction, higher customer satisfaction and new revenue streams

### Consumer adoption drivers:

- Convenience, lower costs, control over finances

### Consumer adoption barriers:

- Low PC penetration and literacy, low Internet penetration, consumer attitudes, lack of trust on the online security

### Key success factors:

- Convenience, innovation-friendly customers, pricing, growing Internet usage

### Trends, vision:

- Internet, the main self service channel
- Estimated maximum penetration level: 70-75% of bank customers
- In the branch, a % of routine transactions will decrease, but the sales of loans, investment products and insurance will increase
- Technology will help customer service to find suitable product mix and guarantee level of service

## **Appendix 2: List of ICT panel experts**

Workshop “Information Society development strategies in Candidate Countries”, 23-25th February 2003, Sevilla, Spain

### **Experts from Candidate Countries**

Mr Attila Bartha, ICEG European Center, Hungary  
Mr Jaro Berce, Government Office for EU Affairs, State Undersecretary, Slovenia  
Ms Jennifer Cassingena Harper, Malta Council for Science and Technology, Malta  
Mr Antanas Cenys, Vilnius Technical University, Information Systems Department, Lithuania  
Mr Vladimir Cermak, EEIP, a.s., Czech Republic  
Ms Dinka Dinkova, ARC Fund, Program Director, Bulgaria  
Mr Peter Druga, PD Consulting, Slovakia  
Mr Roman Galar, Technical University Wroclaw, Institute of Engineering Cybernetics, Poland  
Ms Renata Anna Jaksa, ICEG European Center, Hungary  
Mr Tarmo Kalvet, Praxis Center for Policy Studies, Estonia  
Ms Rukiye Ozcivelek, Tubitak Bilten, Turkey  
Mr Adrian Pascu, Ministry of Research and Education, Romania  
Ms Klara Toth, Toth & Partner Consulting Ltd, Hungary  
Mr Haluk Zontul, Tubitak Bilten, Turkey

### **Experts from the EU and non-EU countries**

Ms Effie Amanatidou, Atlantis Consulting S.A., Greece  
Mr Theo Dunnewijk, Merit-Infonomics, The Netherlands  
Ms Umit Efendioglu, International Labour Office (ILO), Switzerland  
Mr Martin Kenney, Dept. of Human and Community development, University of California, CA  
Mr Terry Landers, CIRCA Group Europe Ltd., Ireland  
Mr Jeremy Millard, Danish Technological Institute, Senior Consultant, Denmark  
Ms Petra Wagner, ARC, Austria  
Mr Arnd Weber, Forschungszentrum Karlsruhe, ITAS, Germany  
Ms Dr Uta Wehn de Montalvo, TNO-STB, The Netherlands

### **Experts from the European Commission**

Mr Tero Hirvilammi, DG Information Society  
Ms Lidia Pola, DG Employment  
Andries Brandsma, DG Joint Research Center, IPTS  
Marc Bogdanowicz, DG Joint Research Center, IPTS  
Jean-Claude Burgelman, DG Joint Research Center, IPTS  
Gerard Carat, DG Joint Research Center, IPTS  
Clara Centeno, DG Joint Research Center, IPTS  
Bernard Clements, DG Joint Research Center, IPTS  
Tibor Dory, DG Joint Research Center, IPTS  
Gustavo Fahrenkrog, DG Joint Research Center, IPTS  
Katalin Gara-Nagy, DG Joint Research Center, IPTS  
Blaz Golob, DG Joint Research Center, IPTS  
Elissaveta Gurova, DG Joint Research Center, IPTS  
Jan Kozlowski, DG Joint Research Center, IPTS  
Corina Pascu, DG Joint Research Center, IPTS  
Ilkka Tuomi, DG Joint Research Center, IPTS